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A REVIEW OF FORTY-SEVEN YEARS OF SURGERY OF THE BILIARY TRACT*

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A REVIEW of one's activity in some special field during a long period of time is of course always of interest to the reviewer himself. He can see where his shortcomings have been and compare his results with those of others. But to make such a study of any value for others, it is necessary to bring out some points which helped to improve the results (at least his) and especially to analyze the causes of failures.

Our first operation on the biliary tract was a cholecystostomy in 1894. From scanning over the records one can readily see that during the first years operations of this kind were rare and from the kind of operations one can recognize the fear of very active surgical interference. Surgery of the biliary system in those early days was not undertaken light-heartedly, as we did not have the blessings of the x-ray. The diagnosis was much more difficult, and numerous cases were not recognized. Cholecystostomy was considered preferable to ectomy in the average case and A. J. Ochsner of Chicago, a most excellent and level-headed surgeon, was much in favor of the conservative cholecystostomy. This operation was even often done in two stages. It was not known whether the removal of the gall bladder would not cause functional disturbances or later on even permanent liver damage. Experience, of course, has settled this long ago. My first patient to receive a cholecystectomy, for instance, is hale and hearty today after forty-one years, at the age of seventy-six. The first patient with common duct stones, from whom I heard recently, is very well at eighty years of age, thirty-nine years after a cholecystectomy and choledochotomy for calculi.

In 1905 the "ectomies" began to be as frequent as the "stomies" in our records and thereafter cholecystostomy became exceptional.

Most of the early operations were for stones. Gradually the "cholecystitis sine concremento" was recognized. During the ten years following my first gall bladder case in 1894, I had nineteen operations on the gall bladder or the ducts. It seemed to be of some historic interest to look them up more closely. Among them was an empyema of the gall bladder which was drained. Another was a gall bladder-colon fistula where an intraperitoneal abscess contained stones, pus and feculent material. The stones were removed and the parts drained. The fistula closed after a while. Another case was of interest on account of the large number of stones. These were quite small, about 1.5 mm. in diameter, but of beautiful tetrahedral shape. A good many of them were lost on the gauze sponges, but a nurse was asked to count what we had collected in a cup. She reported 5,970 of them. I recollect that Osler mentions as many as 2,000 and speaks of another unauthenticated report of 6,000. The stones in our case were removed by a cholecystostomy in 1901. In December, 1924, twenty-three years later, this patient had to be reoperated upon. The gall bladder was about five inches long and again brimful of stones, a larger one in the neck of the gall bladder being the size of a large cherry. The gall bladder was, of course, removed this time. A portion of the abdominal wall was resected in one piece with the gall bladder as it was found thickened around

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a small abscess. Near the fundus a carcinoma had formed in the part which was attached to the abdominal wall. Later on a recurrence took place in the abdominal wall which was excised repeatedly, the last time in June, 1926. She died later on. That the carcinoma was located near the drainage stoma is of significance.

Another one of the cases of the first ten years was an ascites with icterus. The gall bladder was drained and an omentopexy (Talma) was done on October 12, 1901. She left the hospital much improved. The only later entry I could find was of March 15, 1902. It reads "Icterus and ascites completely gone." This was one of the best results we ever had with the Talma operation, as in several other cases the results were mostly insignificant or bad.

Our first cholecystostomy, as mentioned, was done in 1894, the first two cholecystectomies in 1900, and the first two choledochotomies in 1902, all for stones. Among these cases up to December, 1903, sixteen were marked as cured and three as much improved. The classification "cured," I am afraid, must be taken with some reserve, inasmuch as late conditions could often not be traced after this long time. I know at least of another patient besides the one mentioned before on whom I had to remove the gall bladder years later. The fear and indecision which marked these first years of our gall-bladder work are illustrated by two cases in which we performed only a cholecystolysis, freeing old adhesions in which the gall bladder was imbedded. One of these had a Loretta stretching of the pylorus at the same time and reported herself as "very well" fourteen months later. The other had an appendectomy at the same time. Of the remaining seventeen from 1894 to 1903, inclusive, there were: Ten cholecystostomies for stones; one cholecystostomy and Talma's omentopexy for jaundice and ascites; two cholecystectomies for stones; two cholecystectomies and choledochotomies for stones; one choledochotomy for stone in a case of biliary fistula; one a gall-bladder-colon fistula with abscess with removal of stones and drainage.

There were no deaths in these first ten years. However in the next hundred cases there were three deaths but because later gradually more serious conditions had to be taken care of, the total mortality reached practically 4 per cent. While at times there were many cases up to more than eighty in succession without a death, there came from time to time dark days, when some desperate situations confronted us, or when unforeseen or unforeseeable accidents occurred. The following is the list of deaths, thirty-nine in all among the 998 cases in our private practice from 1894 to April, 1941:

CAUSES OF DEATH

1894 to April, 1941

Pulmonary emboli	8
Brachial artery embolus and deliria	1
Ileofemoral embolus	1
Hemorrhage in cerebral ventricles	1
Carcinoma of pancreas or common duct	5
Uncontrollable vomiting	1
Bile peritonitis, pre-operative	1
Acholia after duct drainage (duct stones)	1
Pericholecystitic abscesses with sepsis	5
Influenza peritonitis	1
Peritonitis after abortion	1
Peritonitis starting from old pelvic infection	1
Peracute cholecystitis and pancreatitis	1
Acute cholangitis and general sepsis (pre-operative)	1
Shock (liver shock?)	3
Acute septic hepatitis (pre-operative)	1
Angina pectoris	1
Myocarditis in old severe icterus	2
Renal insufficiency and exhaustion, operative damage to main duct	1
Anuria	1
Pneumonia	1
Total	39

In looking over this rather long list one notices that embolism, carcinoma cases and various infectious conditions play the principal part, but there are also a sizable number of rarer occurrences.

Pulmonary Embolism.—This seems to happen more frequently after operations on the biliary tract than in most other areas except perhaps after those for large uterine fibroids. It is much dreaded by all surgeons, particularly because without premonition it strikes out of a clear sky, and our defense against its happening is poor. In our records it happened once on the fifth day; in the other seven between the ninth and eighteenth day. The chemical means to counteract thrombosis are not practical so far, because it is necessary to keep up a continuous intravenous flow of a heparin solution for many days. Pulmonary embolectomy has been successful a number of times especially with Nystrom and

Giertz of Sweden, but requires a constantly ready set of instruments and before all a very competent and specially trained resident surgeon. In a moderate sized hospital this is out of the question. We others have, therefore, to think first of reducing the incidence of this disaster. In this resignation, it seems to me, we are justified if the occurrence of an embolus can be rendered sufficiently rare. In our last 200 operations on the biliary system we had only one fatality from this source and this occurred in a simple cholecystectomy and appendectomy finished in thirty-five minutes. To avoid clotting in the veins mechanical assistance to the circulation is most important. The patient has to be moved from side to side frequently. When the patient is awake this is done hourly. In addition the legs are bent and stretched three times every hour, at least in part actively. An incision for the abdominal walls which we published in 1934 (*Western Journal of Surgery*, April, 1934) allows the patient to turn as a rule actively very soon after the operation with much less discomfort than with a straight vertical mid-rectus incision. The patient can be taken out of bed even on the day of operation if desirable as in inability to urinate while lying in bed. The main feature of the procedure is a right mid-rectus incision where the posterior rectus fascia is split horizontally on distracting the rectus muscle far laterally. The incision is carried a good distance into the transversus muscle and mesially at least to the midline or a little beyond. If more room becomes necessary one can incise the transversus muscle far laterally up- or downward as it may seem appropriate. It is quite true that one has not as much room as with the straight up and down incision and for this reason our incision may not be desirable when difficult work on the deep channels is anticipated. In the last 200 cases we have however used the straight up and down incision only three times. Eight colleagues were operated upon for gall-bladder trouble and those with this incision were impressed with the fact that they could be taken to the bathroom on the day of operation and as a rule sit up in a chair in two or three days. The patients can move about more or less actively, which is better than passive motion as it will be done more frequently.

Peripheral Arterial Emboli.—These are rare occurrences, but in the long run will happen now and then. They are due to a thrombus torn loose from a pulmonary vein or more often from the left auricle. A most beautiful specimen illustrating how even an embolus from a peripheral vein may enter the peripheral arterial tree by way of a persistent foramen ovale existed in the pathological collection of the University of Geneva, Switzerland. One arm of the forked embolus was firmly wedged into the foramen while the other two kept the embolus from passing through and could be seen sticking out in the right auricle. One of our patients who got a brachial embolism with a cerebral complication is an example of some surgical dilemmas. This patient, a man sixty-four years of age, has had a stroke a little over three weeks before, which paralyzed his left side. He had partially recovered from this when jaundice, nausea, and distressing vomiting with tenderness over the gall bladder supervened. He must have relief. His very competent physician favored operation. Spinal anesthesia was used so as to avoid any rise in blood pressure. The gall bladder was excised and three large calculi were removed from the common duct. On the morning of the sixth day after the operation, the patient was taken up in a chair on account of very distressing asthma from which he had suffered for months. The nurse reported that he cried because he said he was so happy. The highest temperature for the four preceding days was once 99 degrees. At 4 p.m. of that sixth day he suddenly got an embolus in his right brachial artery which within three days resulted in a necrosis of the thumb. He became delirious, developed a high fever and died. Another patient presented a similar picture from an embolus into the femoral artery.

Cancerous growths of the pancreas or common duct were not infrequently encountered. Even when the diagnosis could be made beforehand an unbearable itching would make operation advisable. Five such patients are included in this report. They either died in the hospital or soon afterward. If the patients went home feeling distinctly improved their deaths which followed of necessity later on were not counted. A recent case may be mentioned as an example. Some twenty odd years ago I had resected a woman's cecum and ascending colon for carcinoma; four years ago we had to resect her stomach for carcinoma. Then she came home

from California deeply jaundiced with but little pain but an insufferable itching and scratch marks all over her body. Draining of the gall bladder relieved her from the itching within three days, and the jaundice cleared up. She was aware of her condition but left for home most grateful for the relief.

A case marked *acholia* belongs really in this group of cancers. Jaundice had existed for a long time and no bile came forth after a cholecystostomy. (Four other patients with white bile due to obstruction by calculi got well.)

Bile peritonitis was seen in one patient who was operated upon when already in a precarious condition. The abdomen was found full of bile, but the place of leakage could not be determined. The bile was sucked away and a cholecystostomy was made, but did not help.

One fatality is recorded in 1916 as due to incessant *uncontrollable vomiting,* followed by utter exhaustion. No further data could be found.

Advanced infectious states with pericholecystitic abscesses and with general septic conditions of which a good number were saved are nevertheless represented with five deaths. For instance in 1927 a seventy-six-year-old lady was brought into the hospital with abscesses around a partially necrotic gall bladder with stones. The gall bladder was removed and ample drainage instituted, but while locally the condition was finally quite good, she died thirty-three days after the operation from general sepsis. Colon bacilli were cultured from the blood. All five patients came much too late to operation. A drastic example which is very instructive presented itself in 1937. This patient, a farmer sixty-four years of age, had been lying in a hospital for five weeks under the care of a good surgeon. The chart showed temperatures up to 105 degrees with daily chills preceding. His surgeon had considered the condition too dangerous for any operative interference and at least in the start apparently had hoped for a let-up. It is still the teaching by conservative authorities that one should wait in cholecystitis until the acute process has cooled off. When I was asked to see this man at the end of these five weeks, the abdomen was very much ballooned clearly from peritonitis. In the presence of this unabating high fever and the daily severe chills I felt a chance ought to be given this man, whereupon the case was turned over to me. This was done kindly and —it seemed—gladly. The only somewhat encouraging feature in the frightful picture was that the patient had been able to live through this infection that long. We found a large amount of free thin flaky pus of a repulsive sweetish odor, a partially walled off necrosing gall bladder filled with pus and stones, and in addition a liver abscess. Orange colored pus with a considerable amount of grumous brownish material escaped from a slit-like opening in the liver near the hepatic duct. The gall bladder was removed and the abscess drained. After two weeks of very encouraging improvement the temperature rose again to higher levels. The patient died fifty-four days after the operation. The autopsy revealed multiple liver abscesses and also a lung abscess. This case is a strong argument in favor of prompt active interference in acute cholecystitis. For a good number of years we have followed this principle and have no reason to regret it. If peritonitic symptoms are not abating within twenty-four hours or even much less in serious looking cases, operation is resorted to. If the picture somewhat improves we usually wait a day or two or even three, but only if there is a steady easing up. In more or less advanced acute infections there will always be some mortality in the long run, but in *early acute cholecystitis,* of which we had a good many, our records do not show a single death from peritonitis which we judged to be due to a spreading of the infection from the field of operation. This may well be purely good luck, but it shows that the danger in spreading the infection in cholecystitis by operative interference is surely very small. And at that we have most always removed the gall bladder even in very acute cases.

All this does not say that perhaps cases registered under shock or the one listed as uncontrollable vomiting did not have a certain degree of peritonitis in addition, but they did not die of it. The patient with peracute cholecystitis with pancreatitis and an acute cholangitis did not die of peritonitis but of a general sepsis with which he came into the hospital.

However, there are three deaths from peritonitis in our records. One, to all appearances, was an influenza infection during a severe epi-

demic. There were several grave cases of influenza in the hospital at the time. The other two, however, had a frank postoperative peritonitis, starting in both from the pelvis. One of them after operation had a miscarriage which seemed spontaneous, but what had happened beforehand we do not know. The other patient years previously had undergone somewhere a salpingectomy for infection. A painful and fixed ovary was removed and cord-like pelvic adhesions were divided at the time of the cholecystectomy. The postoperative course left no doubt that the old pelvic infection had flared up again. These three incidents of peritonitis were all in previously afebrile, apparently clean, cases. The last one mentioned furnishes the important lesson that it is not safe to operate at the same session on two conditions in the abdomen if they are too far distant from each other. Either the incision has to be unduly large or the exposure is insufficient. A patient with a large fibroma of the uterus had a hysteromyomectomy and the gall bladder, full of stones, was removed at the same time. She was one of those who are listed as having died of embolism. Since this accident we have divided such procedures into two separate operations. Only in one other similar case did we deviate from this. There was a single round calculus in a long freely movable gall bladder. After the hysteromyomectomy a separate 1.5 inch incision was made over the gall bladder which was brought into the wound by the hand in the abdomen and grasped by some forceps. Through a nick in its wall the stone of marble size was forced out by the hand in the abdomen. The gall bladder was then closed by inverting sutures; in other words a cholecystendysis was done. Healing occurred without incident.

The three cases of peritonitis reported were the only ones where death occurred from this source. They demonstrate that acute cholecystitis, even gangrenous, creates much less danger from a generalized peritonitis than from general sepsis. Therefore out with the gall bladder as quickly as possible. This is well illustrated by the next case:

A woman with very acute cholecystitis with stone impaction and pancreatitis died of general sepsis while the local condition had become surprisingly good after the operation. On the other hand it stands to reason that even early operation may not avert a fatal outcome in inaccessible or overwhelming sepsis, as in a woman who was brought in with an acute cholangitis and fever of 104.6 degrees. Drainage of the common duct did not help—may we say—any more, or was the fate sealed from the start?

We now come to the group of three cases marked as *shock*. Two of these allow of no further specification; they date back to 1921 and 1927. The autopsy in one was negative, in the other myocarditis is mentioned in the protocol. A third one was of recent date (1939) and the notes are more complete. This patient, a very thin worn-out woman of seventy-one years, came with a carcinoma of the fundus of the gall bladder. It had grown into the adjoining parts of the liver. Because the duct area was not involved we removed a triangular wedge-shaped portion of the liver together with the gall bladder. The piece of liver after removal measured 12x10x3 cms. Bleeding was quite moderate. Before cutting the liver the duct was divided and tied. Then catgut mattress sutures were placed through the thickness of the liver and tied over rubber tubes, one above and one underneath the liver. When the liver was cut the assistant's hands kept the liver moderately compressed and the larger vessels were readily grasped and tied. All this went quite smoothly under good spinal anesthesia. However, the postoperative course was an entirely different story. In the night following the operation the temperature shot up to reach 105 degrees in the early morning, and the patient died within twenty-four hours after the operation. There was no cause locally to be made out. We took it for *"liver death,"* as reported in the literature—whatever that may be. In two similar surgical procedures for carcinoma of the gall bladder with sizable resections of the liver the operation was stood quite well.

In 1924 Heyd was the first to describe what he called liver death. Since then a good number of publications on the subject have come out. The picture is characterized by a very rapid development of high temperatures within eighteen to thirty-six hours after operation, a fall in blood pressure, circulatory collapse, coma and death. The temperature may reach 109 degrees. The only pathological finding which could be demonstrated was passive hyperemia and a diffuse disintegration of the parenchyma in the

softened liver with numerous foci of necrosis. The process is not yet sufficiently understood; a toxin is supposed to have formed. The underlying cause of the damage to the liver parenchyma was also thought to be a traumatism during or preceding the operation. Experimentally similar pictures were seen in ligation of the hepatic artery of dogs. In the human, damage of one kind or another to the hepatic artery such as emboli or thrombosis is practically unknown. The theory was then put forth that it might be a severe spasm of this vessel in an already damaged liver. A peracute bacteremia was also considered, but we know nothing further about it.

The next case on the list is classed as an *acute septic hepatitis.* It was not so much a cholangitis as a generalized septic condition with partial ileus, some moderate icterus and a large liver. Cooler judgment might have kept us from interfering surgically. But the patient was a physician whom we all liked for his kind and happy disposition. I mention this purposely. When I first saw him in consultation he was barely semiconscious, had a greatly ballooned abdomen, a high fever and a distinct degree of jaundice. The diagnosis was not sufficiently clear. Was it a common duct obstruction with cholangitis or a septic hepatitis with partial ileus? I suggested one might try the last thing, draining the bile channels, and my colleague, who had seen more of the patient and had his misgivings, asked me to do it, he assisting. A simple cholecystostomy was done as the gall bladder was full of bile. The outcome was as he had foreseen, and I had been fighting not to see, at least not so definitely. In private practice—and all my cases were such—one is at time induced by sentimental reasons to try what on cool judgment would be ruled out. This also depends much on the temperament of the surgeon and on his former experience.

An occurrence, dating back to my early surgical days in the nineties has remained fresh in the memory. A middle-aged strong man was brought to the hospital with a fever over 104 degrees and deeply jaundiced. He was in a maniacal state and unconscious, yelling and throwing himself around in the bed. This had started quite acutely a few days before. I showed the patient to some of my colleagues as a classical picture of acute yellow atrophy of the liver. The very acute onset, the very high fever, and the surprisingly deep jaundice after such a very short time seemed to clinch the diagnosis. He died within about three days after entering the hospital. The autopsy demonstrated a round stone at the ampulla the size of a large pea. The liver was very large, but I cannot find the microscopic slides any more. From the course of the illness I am still inclined to think it was an acute yellow atrophy with its hopeless prognosis, induced perhaps by the sudden obstruction. But it still has the effect on me as an error of omission.

The next item on the list is angina pectoris, represented by one death three weeks after the operation, a cholecystectomy. Coronary symptoms and gall-bladder diseases often have a very definite interrelation. I have followed this for many years. I have seen clear-cut coronary conditions which killed patients a short time later, where there was a very exquisite local tenderness over the gall bladder even on quite gentle palpation. Though what I am going to say is only speculation and must be investigated properly by some competent internist, the frequency of the combination of symptoms from both these organs, heart and gall bladder, cannot be overlooked. At the very moment of writing these notes I have two patients in the hospital on whom we removed the gall bladder for impacted stones. Both had been treated for heart trouble, one for several months, while the other had recently been in a hospital for five weeks on account of her heart. Both are distinctly improved since the operation. Heart and gall bladder have their innervation from the vagus and the sympathetic. If one studies the grave and sudden spasms and inhibition reflexes in traumas of the chest one becomes impressed by the enormous importance of these reflexes. Constantini of Algiers gave the best discussion of the subject I personally have heard, at the International Congress of Surgery at Brussels in 1938 (*Journal Internat. de Chir.,* 1938). It is very conceivable that a chronic infection of the gall bladder may cause myocarditic changes and that an acute impaction of a stone may bring on spasms in the coronary system. Myocarditis in severe icterus of long standing is given as cause of death in two cases. The long delay before operation had undoubtedly much to do with the fatal outcome.

In the table of our fatalities now comes a case entered as "Renal insufficiency and exhaustion after operative damage to the main duct." Here we have to confess to a technical error, the memory of which remains painfully vivid after thirty-one years. It was a cholecystectomy, done as was the rule in those days, and is done by many today, from the cystic duct outward. The wound healed and the patient left for home in the country. Everything seemed in order. Two months and five days after the operation this woman returned to the hospital in a well nigh desperate condition. There was a moderate icterus, surprisingly moderate for what we then found. She was very weak, had pain in the upper abdomen. The temperature was 98 degrees. The specific gravity of her urine was 1.002 and contained a trace of albumen. On reopening the abdomen we found a pool of bile, fairly well walled off. An injury to the common duct had occurred at the operation. Apparently a small slice of this duct had been cut away. Chromic catgut had been used and leakage, it seems, started only weeks later when the catgut gave way. An anastomosis between hepatic and common duct was made, but the patient weakened out promptly.

In another similar instance we were fortunately aware of the accident at the time of the operation. The gall bladder with the greatly thickened cystic duct was removed and in the bulk of the inflammatory mass around the cystic duct was the whole length of the hepatic duct. A catheter was then inserted to splint the parts which could not be brought together in a satisfactory manner. For this reason it was intended to leave the tube in place as long as possible. One end of the catheter, cut off on a slant, was pushed into the left hepatic duct and the tip of the catheter inserted into the common duct and through it far into the duodenum. A roentgen plate showed it to reach the duodenojejunal junction. The wound healed and there was no discomfort from the tube which was seen by x-ray repeatedly to have remained exactly in the original position and to be free from recognizable incrustation. We figured, the longer we could leave the tube in, the safer we would be from a subsequent stricture. At the end of two and a half years some fever and discomfort set in and the tube was removed transduodenally. Bacteriologic examination yielded a practically pure culture of bacillus gracilis. This woman is now eighty-eight years old and had her operation at the age of sixty-nine. She was reported recently to be well and very active though she had a slight stroke of apoplexy a few years ago.

Since this last accident we have changed the technique of cholecystectomy by starting at the fundus.

The list of our failures closes with a case of anuria in a seventy-year-old man and one of pneumonia also in a seventy-year-old man. This latter happened in 1904 after a cholecystostomy under ether anesthesia. It is not only the single pneumonia death in these records, but no other frank pneumonia has occurred. This is a fortunate fact for which all credit must go to our most conscientious and competent anesthetist, Miss Marie Gronvold, who has worked with us since 1898. From 1930 on we have used almost exclusively spinal anesthesia by the method I described in MINNESOTA MEDICINE, December, 1930.

It was thought that a report of the fatalities, thirty-nine in 998 cases, would be of more interest than anything I might have to say, and we therefore gave it most attention. As to the technique, we have for many years closed the wound tight where drainage was not imperative, probably in 60 per cent of all our cases in the last fifteen years. Even in operations during an acute attack of gall-stone colic the abdomen is closed without drainage more often than not. However, it is not wise to set hard and fast rules, and above all it is necessary to feel safe against leakage of bile. For this reason it is of great value to leave as much connective tissue on the liver side as feasible, a point recently advocated, but practiced and emphasized by us for nearly twenty years. Even with this careful procedure it is necessary to look closely for any possible leakage of bile. This is done with a gauze sponge, left in place for a little while after all oozing has stopped. Once I noticed a whitish cord, like a small artery of about two millimeters in diameter, at the edge of the gall bladder bed midway between fundus and cystic duct. On watching it, we could see bile escape from it.

Remembering the French saying that "the art of boring an audience is to be complete," I will only mention a very few technical points. First I want to describe in short a form of cholecysto-

gastrostomy or cholecystoduodenostomy which gave us the impression of neatness and simplicity. If the gall bladder is rather normal though distended as so often in carcinoma of the pancreas, the contents are first aspirated and two continuous sutures bring the selected areas of the gall-bladder ampulla and the chosen gut together. Now a Hegar uterine dilator of the size of a little finger is pushed into the gall bladder through an opening barely large enough for it. Thus leakage is prevented (though uninfected bile is harmless, and after mopping it away it need not prevent one from closing the wound tight). The metal rod is then made to bulge at the ampulla of the gall bladder directly in front of the sutures. A nick allows the rounded end of the rod to emerge and a nick in the gut permits it to enter it airtight. The inner of the continuous sutures then catches the edges of the nicks and the second suture grasps the peritoneum not too close to the inner suture. Before removing the rod a large sized catheter is prepared. The distance to which it is desirable to introduce it into the gut is measured and at an appropriate place a side opening is cut to rest in the lumen of the gall bladder. The catheter can remain as long as desired and if sufficient inverting suturing was done it can at any time be removed without leakage following. One might even claim that this method is better adapted to avoid cholangitis, which is a serious complication, often following the usual kind of anastomosis with the fundus of the gall bladder. In this latter case peristaltic contraction of the gall bladder will force intestinal contents, which have entered, toward the deeper bile channels. With our modification the tube gives good protection while it is in place, and after its removal muscular contraction has the tendency to force the gall-bladder contents through the stoma back into the gut.

Let me mention some important points in the draining of the common duct. In case a T-tube is used, possible difficulty on removing it later is obviated if the crosspiece which is to lie in the duct is transformed into a simple trough by cutting half of it away lengthwise. It then doubles up more readily on withdrawal. If an ordinary rubber tube or catheter is used it should not be inserted up toward the liver as it is the trend to do, but in the downward direction. At the proper place an extra hole is cut in it. If the tube is inserted upward, the lower part of the opening in the duct is compressed by the slantingly entering tube while the upper area is stretched. On withdrawal later on, the bile wells freely into the wound, but the distal duct opening is more or less rigidly held in a slit-like manner. The degree of rigidity of this lower whistle-shaped opening depends of course on the length of time the tube was left in. On the other hand, if the course of the draining tube is downward, the bile on removing of the tube finds no difficulty in escaping the slit-like upper opening and is now readily received by the funnel-shaped lower opening. A troublesome biliary fistula is thus avoided. The bile has in this procedure naturally the tendency during the first days after the operation to leak into the wound, but this has little importance if the wound is properly drained and the patient is kept in prone position for at least twenty-four hours. By this time the parts are walled off, enough to permit at intervals a right-sided lateral position.

Among the many unusual findings which everybody encounters in the long run, two cases come to memory, which I may be permitted to add in short. One was a gall bladder which contained two and a half liters of thin pus. The hand and half of the forearm introduced into this sac which was adherent everywhere could readily palpate the right kidney and the neighboring structures.

In another instance we found a beautiful blue gall stone about an inch in its longest diameter. It was clearly an indigo calculus. It came from a gall bladder with a foul smelling content due to colon bacillus infection. The explanation must be looked for in the decomposition of proteins with the formation of tryptophane. Tryptophane is indoxyl-aminopropionic acid. It is freed out of the proteins by fermentative disruption of the protein molecule. Through bacterial putrefaction tryptophane goes over into indoxyl. The indoxyl in the presence of oxygen is changed into indigo blue. I remember reports of renal calculi composed of indigo, but I have not run across a report of a blue gall stone.

In summing up our observations it may be stated that in going through the material, comprising a period of forty-seven years, some surprises awaited us, as for instance the absence of any mortality during the first ten years. On the other hand, bad and desperate cases came

later on at times, to raise the total mortality to almost 4 per cent. This includes hopeless cases where an operation was done only to alleviate the last remaining days of life. Such cases might in all fairness be excluded from a mortality statistics, but I wanted to give you the full picture without any manicuring. Sure enough, we had repeatedly long intervals without any failures, but apparently there are few summers without lightning.

What does the review of our material tell us?

(1) Pulmonary embolism has become decidedly rarer since the patients are made to move about and to move their legs, actively if at all possible, hourly during the wake hours. The patients are explained the importance of it. Our abdominal incision makes them move about in bed with much less pain.

(2) There will always be instances where only palliative measures are possible and others where poor conditions of heart and kidneys are prone to lead to disaster. Errors of omission or commission will depend to a certain degree on the individuality of the surgeon.

(3) Most important, the survey of our material showed that *postoperative* peritonitis, even in acute cholecystitis, is almost negligible with proper management, while on the other hand a septic condition exists quite frequently before operation. Even a gangrenous cholecystitis creates much less danger from a generalized peritonitis than from general sepsis. This urges us not to delay operative measures even in very serious states of infection. In grave septic cases failures will often be unavoidable, but we may also frequently save a life otherwise hopelessly lost. Under such conditions, who would bother about statistics!

TUBERCULOSIS IN THE SILICOTIC SUBJECT*

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CERTAIN American clinicians have been questioning the classical concept that a high tuberculosis rate is an essential part of the picture of silicosis. They point out that the roentgenographic patterns that have been described as characteristic of tuberculosis are too often unassociated with either pathognomic symptoms or the presence of acid-fast organisms in the sputum to warrant such an assumption. A few objectors have reported autopsies in which no trace of tuberculosis could be found in the lesions in question. I shall present evidence which, I think, explains their difficulties and shall reaffirm my faith in the fundamental teaching of the South African School. I shall indicate that in most of its stages silicosis does increase native susceptibility to the tubercle bacillus but that after the reaction to silica has healed such alteration need no longer exist. I shall also recall that there can be no tuberculosis without the tubercle bacillus and hence the amount of infection in a silicotic group, like that in any community, will be governed by the number of carriers. Finally, I shall cite evidence for believing that tuberculous infections in a silicotic subject may heal, particularly under the influence of certain other mineral particles inhaled in association with free silica.

The original concept, that silicosis specifically predisposes to tuberculosis, is founded upon an impressive body of clinical and pathological observations eminating from the Miners' Phthisis Bureau of the Union of South Africa. Their figures indicate that of the old silicotic gold miners who died and came to autopsy approximately three-quarters showed evidence of associated tuberculosis. Similar findings have subsequently been reported in industries in this country which produced dusts of high silica content. Such, for example, was the experience in the Joplin lead and zinc mines and the Barre granite industry. Pathological investigations from various places have offered confirmation. In a large series of

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autopsies reported by the Medical Research Council of Great Britain, tuberculosis was discovered in 65 per cent of the cases with silicosis. In the experience of the Saranac Laboratory, tuberculosis complicated 60 per cent of the lungs of persons who had been exposed to various dusts of high quartz content. Among those who had inhaled minerals of other kinds tuberculosis occurred in only 15 per cent.

Animal experimentation has demonstrated a specific alteration of native susceptibility to tuberculous infection that is not produced by minerals other than quartz and similar forms of free silica. Strains of tubercle bacilli that are incapable of causing progressive tuberculosis in normal animals of different species provoke chronic and often fatal infections when introduced into silicotic animals. This has been the usual outcome with silicotic guinea pigs infected with the attenuated strain of tubercle bacillus, R_1, and in silicotic rabbits inoculated with small doses of human type bacilli. An experiment first performed by Kettle has demonstrated clearly that the necrotic tissue produced by a local injection of a sufficient quantity of fine silica particles provides a medium upon which tubercle bacilli multiply very rapidly. This effect does not follow unless four or five days are allowed to elapse between the injection of the silica and that of the bacteria. Therefore it is the tissue reaction to the silica rather than the presence of the mineral particles which stimulates growth of the organisms. Neither Kettle nor various investigators in the Saranac Laboratory have been able to obtain consistent verification of the observation of Price that the addition of silica to culture media stimulates the growth of tubercle bacilli. Probably emphasis should be laid on the silicotic *necrosis*, for older lesions which are composed of mature scar tissue with calcification of necrotic elements seem to have much less effect upon bacterial proliferation. Kettle also showed that necrosis caused by other irritants, like croton oil, does not favor growth of tubercle bacilli and Vorwald and Landau proved that a variety of silicates and non-siliceous minerals are equally ineffective.

Finally, experiments have shown that in animals made to inhale mixtures of quartz and other minerals, such as iron oxide, R_1 infections may progress to involve large areas of the lungs and then heal leaving extensive fibrous scars. In animals surviving for several years histological evidences of the original tuberculosis are often hard to discover. Where still present they may be localized to small foci in the widespread fibrous lesions.

Returning to the clinical field, it should be noted that the classical studies on silicosis which formulated our concepts of this disease, were made in old, long-established industries, usually isolated in rural or mountainous districts. The industrial populations were stable or at least composed of specialists who would only migrate from one location to another where similar work was to be had. The rocks being manipulated were of high free silica content, usually in excess of 30 per cent, and dust was produced with little or no effort to control it. A fatalistic complacency decreed that a man should work until disabled, by which time no x-ray was needed to discover evidences of tuberculosis. Sputum examinations demonstrated the presence of many open carriers. In fact, the tuberculosis which served as an indicator of the silica hazard could not be concealed.

In contrast to such pictures, the general application of mass survey techniques is revealing silicosis that has developed under very different circumstances. Many of the plants are located in large cities where tuberculosis control programs are in effective operation. Unskilled laborers move from job to job where they may be exposed for short periods to any number of industrial dusts, some dangerous, others perhaps leaving only shadows on an x-ray film as evidence of exposure. All members of a group are now being examined and we see evidences of the early as well as the late stages of disease. Tuberculosis is recognized earlier and the carriers are eliminated. The concentration of dust in places of work is being reduced. Few autopsies are obtained upon men dying with minimal dust reactions and those that are may be misinterpreted by general pathologists unfamiliar with industrial environments. Our concepts of the disease process are based upon roentgenographic shadows and not upon pathological tissue reactions.

Naturally, under modern conditions we will not find as much tuberculosis because the opportunities for infection are being reduced. Fewer persons with latent infections now enter the dusty trades and the open carriers are being hospitalized. Infections are being discovered in pre-

clinical stages just as they are in the general population. Presumably the predisposition still exists but without contact with infection at the proper time tuberculosis cannot develop.

The general practitioner and internist who see only an occasional case of silicosis, and this perhaps in an advanced stage, have a different impression of the disease than the industrial physician who in one industry has had opportunity to observe the evolution of a particular type of silicosis and associated tuberculosis. The latter, by serial films taken year after year, sees the disease process develop in dozens of individuals; he recognizes that in normal lungs silicosis is manifested as a generalized discrete nodulation and to him any localized conglomerate shadow suggests a complicating infection. Clinical symptoms of such infection may be lacking for prolonged periods but in time, perhaps years later, he has seen many conglomerate lesions break down and then the symptoms of tuberculosis become apparent. Autopsies on these cases have substantiated the nature of the localized infection.

Long observation of experimental and human pathological material have confirmed my own belief that the silicotic subject in most cases is more susceptible to tuberculosis than the normal one. But experience with animals leads me to suspect that when the silicotic fibrosis has passed the stage of greatest activity susceptibility to infection also wanes. This would explain certain cases, to be mentioned below, in which tuberculosis behaves typically in a silicotic host. If these deductions are sound, one has an explanation for some of the apparent exceptions to the classical picture. If, in addition, it be accepted that the presence of other minerals in the silicotic lung tends to promote healing of a tuberculous infection after it has progressed for a period, one finds explanation for many of the cases of massive fibrosis seen in silicotic subjects which offer such problems in diagnosis.

The anatomical forms of tuberculosis encountered in silicotic lungs can be comprehended in four categories:

1. The primary complex, including tubercles in the pulmonary parenchyma and the tracheobronchial lymph nodes.

2. Typical reinfection tuberculosis, usually located in the upper third of the lung.

3. Tuberculosilicosis, a very chronic form which constitutes the commonest manifestation of the infection.

4. Acute perinodular tuberculosis, a rare form.

So-called *primary tuberculous infection,* if acquired during childhood probably has little significance in silicotic individuals. At least it is most uncommon to observe the pulmonary portion of the complex reactivate and spread locally under the influence of inhaled silica. The obvious reason is the fact that so few of these foci contain living tubercle bacilli at the age of industrial employment. The lymph node infections, on the other hand, may persist longer and it is conceivable that accumulating silica might reactivate a latent focus with resultant ulceration into a bronchus and dissemination into the lung. Recently a case suspected of such pathogenesis was sent to the Saranac Laboratory and it is possible that others in which massive conglomerate reactions spread like fans from the hilum may be of the same origin. If a first infection is acquired later in life, after the silicosis has already developed, one would expect an acute reaction similar to that observed in animals. Such cases will be considered under the fourth category of acute perinodular tuberculosis.

Reinfection tuberculosis of typical character, located in one or both pulmonary apices, occasionally appears in persons with slight amounts of silicosis or possibly in men whose dust reaction is old and no longer active. Under such circumstances the infection behaves typically and presents the usual clinical symptoms. It spreads locally within the lungs by way of the bronchi and gives rise to laryngeal and intestinal complications.

Tuberculosilicosis is much the most common manifestation of tuberculosis in silicotic subjects. It is characterized by one or more localized areas of massive fibrosis, situated usually in the upper lung although they may occur anywhere and are often bilateral. In typical cases there is a background of generalized silicotic nodulation but not infrequently in roentgenograms the nodular shadows may be absent or hard to discern because of contraction of the lung and superimposed emphysema. Such reactions are extremely chronic and serial films may reveal little change for several years. Usually there is some increase in the size of the area but bronchogenic spreads

into other parts of the lung do not occur. Laryngeal and intestinal complications are rare. The massive lesions cast too dense a shadow with ordinary exposures to permit visualization of their structure but in over-exposed films it may be possible to detect cavities in the late stages of the disease.

Anatomically the lesion of tuberculosilicosis is characterized by several unique features not seen in any other manifestation of tuberculosis. The involved area is rather sharply defined although string-like extensions may radiate into the surrounding tissue. It is stony-hard, usually black, grey or brownish in color. Careful inspection generally reveals nodular collections of scar tissue embedded in a matrix of similar appearance. In the active cases the tuberculous elements are manifested as foci of yellowish caseation or perhaps cavity formation with yellowish necrotic walls. When the infection is inactive it may be impossible to detect on gross inspection. With the microscope small tubercles are generally discovered if enough tissue is examined. However, a negative result reported from examining a few ordinary sections is of little significance. The traces of specific tuberculous reaction may be so widely scattered in the dense mass of fibrosis that only after examining several large sections, 3 or 4 inches in diameter, will the true nature of the process be apparent. A prominent feature of the microscopic picture is the obliterative endarteritis that involves most of the included arteries. The poor blood supply resulting from this condition frequently produces foci of anemic necrosis which may be several centimeters in diameter. These cavities can usually be distinguished from tuberculous ones by the absence of any definite wall or differentiating change in color. The tissue simply softens, leaving a slit-like opening filled with inky fluid, and bordered by a granular zone. Microscopically there is no evidence of leukocytic reactions. The bronchioles within such areas are compressed, distorted and show varying degrees of inflammatory reaction. Other portions of the lungs are almost invariably emphysematous and chronic adhesive pleurisy complicates all tuberculosilicotic foci that extend to the surface of the lungs.

As already indicated, this form of the disease is extremely chronic. Figures from South Africa indicate that, in the absence of a positive sputum, 53 per cent of its victims were still alive twelve years after its first appearance in a film and only 23 per cent had died within three years. The sputum tends to remain negative until late in the disease or at most only occasional organisms are found on repeated examination by culture or guinea pig inoculation. This, of course, can be explained by the infrequency of ulceration into the bronchi. The avascularity of tuberculosilicotic foci minimizes absorption and hence symptoms of intoxication are few. The same may explain why some of these cases fail to respond to ordinary doses of tuberculin. Dyspnea is the cardinal symptom and this is usually due to the associated emphysema.

The conglomerate focus of massive fibrosis in the silicotic subjects presents a problem in differential diagnosis both to the clinician and the pathologist. It is generally assumed that most large conglomerations are indicative of infection and the infection is most probably of tuberculous origin. Some of the smaller foci may be due to fusion of several discrete nodules but in my opinion there is a basis of infection in most of them. The infection may have healed leaving only sterile scar tissue to mark its site but this abnormality is sufficient to produce conglomeration. Infections other than tuberculous are capable of causing such reactions but their frequency is not known.

In pathological material, I have found definite evidence of tuberculosis in 60 per cent of the conglomerate lesions and in 60 per cent of these the infection was active and obvious; in the rest it usually required prolonged search to discover an occasional tubercle in the mass of silicotic fibrosis. In the remaining 40 per cent of the conglomerate foci no trace of tubercle was discovered. Whether this was because some other cause was responsible for the conglomeration or because enough tissue was not examined to find a small residual focus of tuberculosis is uncertain.

Acute perinodular tuberculosis is a rare form of tuberculosis apparently due, as indicated above, to implantation of a first infection upon a lung already silicotic. In my own experience it has occurred only in comparatively young persons. Earlier films on them have revealed the uniformly distributed shadows of generalized nodulation with their characteristic sharpness of definition. Then a routine reëxamination may disclose a change. The nodular shadows are no longer clean cut but have ill-defined fuzzy bor-

ders and somewhere in the lung field there is an equally ill-defined localized shadow.

The subject manifests symptoms of acute infection which increase in severity. Roentgenograms now show a tendency to consolidation. Tubercle bacilli appear in the sputum. In one case the lung ruptured with resultant empyema. Death occurs within a period of months and autopsy discloses an acute tuberculous pneumonia. Animals with fully developed silicosis in an active stage that are given a first infection also die of an acute tuberculous pneumonia and the process begins with the formation of tuberculous exudate about each silicotic nodule. In the human cases the early roentgenograms with their perinodular zones of haziness suggest that a similar mechanism is operative.

As has been indicated the one difficult problem of diagnosis is the case with a chronic, conglomerate lesion and dyspnea but no symptoms suggestive of infection. Experience has amply demonstrated that many of these patients will ultimately break down and die of tuberculosis but that there are some whose fibrous scars no longer contain living tubercle bacilli. Without the help of clinical symptoms the two types are hard to differentiate. At the present time one must assume that all of them are potentially active, keep them under careful observation with reëxaminations at least annually and be guided by the outcome. A lesion which changes appreciably within a year is most suspicious. It is doubtful whether the advanced case will be benefited by sanatorium care; the time for effective treatment is at the moment when conglomeration first occurs. Most of these men are short of breath but many may do well at light work. Prevention and not treatment should be our objective in tuberculosilicosis.

FISTULAS BETWEEN THE URINARY TRACT AND VAGINA*

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SINCE the beginning of medical history one of the important problems confronting the physician has been the care of the patient with a fistulous communication between the urinary tract and the vagina. Rawls[15] in 1931 made a comprehensive review of this subject. He indicated that surgical cures had been effected by various men prior to the time of Sims[17] in 1852. However, the well-conceived principles and the execution of them by Sims paved the way for the success which the surgeon now has in caring for this condition. Before 1900 further notable advances were made by Trendelenburg, Sanger and Fritsch,[18] who introduced flap-splitting, and by Mackenrodt,[18] who advocated free mobilization of the bladder and separate suturing of each layer of the vagina. Trendelenburg[8] was the first to utilize the suprapubic extraperitoneal or intravesical route and von Dittel[8] first made an approach transperitoneally.

Gynecologists of repute have contributed to the development of the surgical treatment of this condition but the good results now obtained in large measure are due to the work of the men just mentioned. A partial review of the more recent literature does not reveal any striking innovations in the treatment of vesicovaginal fistulas but does indicate that each surgeon is still applying basic principles with refinements of his own or of his contemporaries.[1,2,4,5,9,10,13,14,16,20,21] The mechanical ability of the surgeon in sizing up the situation in each case and utilizing the tissues to best advantage is most important.

Mayo[12] reported his method of treatment of small vesicovaginal fistulas in 1916. Since that time, Judd,[7] Masson,[6,11,19] Counseller[3] and others have added their reports of work done at the Mayo Clinic on this particular problem. Judd and Counseller, in their respective reports, reported on a total of 263 cases, in 259 of which surgical repair was employed. To this number we wish to add forty-eight cases of fistulas between the urinary tract and vagina in which surgical repair was undertaken at the clinic and thirteen cases in which operation was not per-

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formed. These cases were encountered at the clinic from January, 1937, to December, 1939, inclusive. The statistics obtained from a review of the histories in the forty-eight cases in which surgical treatment was employed at the clinic are given in Tables I to IV.

TABLE I. ETIOLOGIC FACTORS IN FORTY-EIGHT CASES OF FISTULA

	Cases	Per Cent
Operative procedures	33	68.7
Abdominal hysterectomy	23	
Vaginal hysterectomy	3	
Chemical hysterectomy	1	
Other operative procedures	6	
Obstetrical procedures	13	27.1
Radium treatment	1	
Congenital fistula	1	

From these statistics it is possible to derive a number of pertinent facts. In almost 69 per cent of these forty-eight cases fistulas developed after surgical procedures and in 27 per cent after childbirth (Table I). This represents a decrease of 12 per cent in the number of cases resulting from obstetrical procedures since Judd's report in 1916. This finding probably is due to the fact that obstetricians have recognized more fully the danger of prolonged labor and have been more accurate in their estimation of the pelvic capacity of their patients. As has been pointed out many times, operative obstetrical manipulations do not cause fistulas but the trauma and devitalization of vaginal and vesical tissues, incident to prolonged and difficult labor, are the real causes in most cases. In our series of forty-eight cases in which surgical repair was undertaken, four fistulas developed following surgical procedures performed at the clinic; forty-four developed following operations, obstetrical procedures and other causes before the patient came to the clinic. There was no instance of fistula in the obstetrical service at the clinic. Injury to the bladder or ureter is an occasional occurrence in difficult pelvic operations. If this is recognized at the time of operation, it usually can be easily repaired. If a fistula develops at a later date, it usually means that the injury was not recognized.

Most injuries to the ureter occur at a point low in the pelvis. When this occurs the injured ureter should be transplanted into the bladder wherever possible. Occasionally in a difficult case when the infundibulopelvic ligament is being tied or when a large adherent tumor is being mobilized, a ureter is injured higher in the pelvis. In such cases transplantation into the bladder is not feasible. Two courses are open to the surgeon, however. If the kidney on the opposite side is in good condition the injured ureter may be ligated. If this is not deemed advisable, the ureter can be transplanted to the skin and later it can be transplanted into the sigmoid or nephrectomy can be performed. Occasionally an injured ureter can be repaired, but the advisability of repairing an injury to the ureter is debatable as often ureteral stricture and subsequent pyelonephritis develop.

TABLE II. TYPE OF FISTULA

Fistula	Cases
Vesicovaginal	40
Urethrovaginal	2
Ureterovaginal	2
Uterovesical	4

The various types of fistula which were encountered in this group of cases are listed in Table II. Most of them were communications between the vagina and bladder but other types occurred with enough frequency to make an accurate pre-operative diagnosis extremely important.

That the condition may be difficult to cure is evidenced by the fact that twenty-nine of these patients had ninety operations or more than three per patient before they were seen at the clinic (Table III). Only nineteen, or less than 40 per cent, had had no previous operations. At the clinic thirty-eight (79.2 per cent) of the forty-eight patients had one operation and seven (14.7 per cent) had two. Three patients had more than two operations.

Vaginal closure was employed in 85.48 per cent of the cases. Other procedures were necessary in seven. These consisted of transplantation of the ureters into the sigmoid in two, abdominal closure in three, and nephrectomy in

TABLE III. NUMBER OF OPERATIONS FOR REPAIR IN FORTY-EIGHT CASES OF FISTULA

Operations	Cases	Per Cent
Before admission to clinic		
None	19	39.6
1	9	18.8
2	7	
3	2	
4	3	
5	2	
6	5	
9	1	
Total	90*	
At clinic		
1	38	79.2
2	7	14.6
3	1	
4	1	
6	1	
Total	65*	

*Operations.

TABLE IV. TYPE OF OPERATION AND RESULTS IN FORTY-EIGHT CASES OF FISTULA

Operations and results	Cases	Per Cent
Vaginal closure	41	85.4
Abdominal closure	3	
Transplantation of ureter	2	
Nephrectomy	2	
Results		
Success	42	87.5
Failure	6	12.5

two. The last procedure was done because of severe pyelonephritis with poorly functioning kidney on the involved side.

Of the forty-eight patients, forty-two or 87.5 per cent were cured by the operative procedures employed (Table IV). Some member of the surgical staff had kept in touch with all but three of the forty-eight patients for at least six months after operation. Data as to the rate of cure were deduced from this correspondence. These compare to previous reports from the clinic as follows: Judd obtained follow-up information in fifty-six of the seventy-eight cases which formed the bases of his report. Of his fifty-six patients, forty-six reported a complete cure. Four reported no benefit and six partial benefit. Thus 82.2 per cent of the patients who answered his inquiry were cured. Counseller stated that follow-up reports were incomplete in twenty-six of his 181 cases. One hundred and one patients reported that they were entirely cured and forty-eight complained of vesical difficulties; that is, of burning, frequency and pain. Leakage of urine persisted to some extent in a few cases. From this statement it is impossible to give the percentage of cures effected, although it is obviously high.

There were no operative deaths in the series reported by Judd. In the series of Counseller there were six deaths, three followed transplantation of the ureters because of a malignancy of the uterine cervix. Pyelonephritis, pulmonary embolism and pneumonia were the chief causes of death. In our series, that is, in forty-eight cases, there was one death which followed an attempt at abdominal closure. In this case intestinal obstruction which required enterostomy occurred, bronchopneumonia developed and death ensued.

In the three years covered in this report thirteen cases of fistulous communication between the urinary tract and the vagina were encountered in which operation was not performed because of the pathologic changes or because of personal reasons. Fistulas had developed in seven of these thirteen cases as a complication of carcinoma of the cervix; in three treatment with radium had been given. The etiologic factor in the other six cases was delivery in three, hysterectomy in two and incision of an abscess in one.

From 1933 to 1939 inclusive, one of us (Masson) has operated on thirty-four patients having vesicovaginal fistulas. In only one case was it impossible to effect cure. This is a rate of cure of 97 per cent. In the case in which failure occurred a large fistula was present and transplantation of the ureters into the sigmoid was recommended. The patient refused this operation but requested that an attempt be made from below. This was attempted with resultant failure.

In a recent letter this patient, however, stated that she is definitely better and by wearing a

tampon, which she makes herself out of a third of a sanitary pad, she has no trouble retaining urine for a considerable time and it is only when she is going out for any length of time that she has to wear a pad. She is very happy and thinks

Fig. 1. Long-handled instruments, fine needles and fine catgut are important aids.

that it is not necessary to have anything further done.

Operative Procedures

During the past few years the following procedure has been employed in repairing vesicovaginal fistulas of the majority of patients. General examination is made to certify the patient's ability to withstand a surgical procedure. Cystoscopic examination is conducted in order to determine the location and size of the fistula and its relationship to the ureters. At this time a silk thread which runs through the urethra, bladder, fistula and vagina is tied in place. If local treatment is necessary to clear the vagina and bladder of incrustations and infection, this is done before operation is attempted. Preoperatively the gastro-intestinal tract is emptied by purgation and enemas.

The patient is placed in the prone position with the buttocks elevated by a kidney rest (Kraske position). The vagina is thoroughly prepared with several coats of tincture of merthiolate. Instruments used which facilitate the operation are illustrated in Figure 1. An ordinary Fritsch abdominal retractor is inserted into the vagina and strong upward traction on the perineum serves to give adequate exposure of the anterior vaginal wall up to the vault of the vagina. With this position and type of retraction it has been possible to expose fistulas well up in the vault of the vagina without resorting to the Schuchardt incision. Downward traction on the cervix or uninvolved portion of the vaginal vault by a properly placed tenaculum also serves to facilitate exposure in difficult cases.

The silk thread, which was inserted preoperatively, is replaced by a silver or alloy wire. With this wire as a guide the fistula is dissected out, leaving a small amount of vaginal mucosa around the fistulous opening, and the bladder is mobilized as much as is necessary. The type of vaginal incision depends on the location and size of the fistula. In large fistulas the use of the wire is obviously unnecessary. The bladder opening is then closed by the use of interrupted sutures with No. 000 chromic catgut down to but not through the mucosa of the bladder. If the fistula is very small, a purse-string type of suture may be used; however, this type of suture is used only occasionally. The edges of the fistula are usually inverted into the bladder. This is easily accomplished if, after placing but before tying the first line of sutures, a moderately blunt nosed curved hemostat is clamped to the vaginal end of the wire guide and traction made on the end which comes from the urethra. As the end of the hemostat causes pressure on the fistulous opening, the sutures are tied and as the hemostat and wire are removed, inversion is accomplished. If possible, the first layer of sutures is reinforced by a second layer of catgut in the bladder. The vaginal layer is closed separately by placing several interrupted mattress sutures of fine black silk. This serves to pucker the vaginal layer over the site of closure in the bladder and to bring into apposition a larger portion of the vaginal layer. No attempt is made either to dissect out or suture separate layers in the vagina. Interrupted fine silk stitches are then placed in the edges of the vaginal incision. This procedure is carried out always bearing in mind the basic principles of adequate mobilization of the bladder and vaginal flap and of closure without tension. If these principles are neglected, failure is likely to result. When possible the line of the vaginal closure is made in a direction opposite to that of the vesical closure. The essential points of the operative procedure are illustrated in Figure 2.

The type of suture used in the repair of these fistulas has been a subject of considerable controversy. Our only experience with silver and

all other types of metal sutures has been to remove them. Undoubtedly certain surgeons find the use of metal sutures advisable but the use of catgut and silk has proved satisfactory at the clinic.

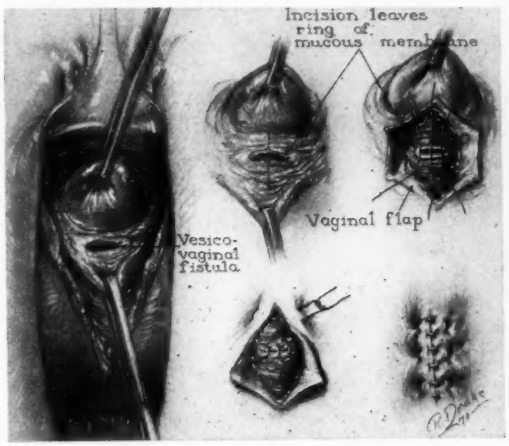

Fig. 2. The prone position and upward traction on the perineum with tenacula holding cervix and uninvolved portion of vaginal mucosa, give adequate exposure. Small rim of vaginal mucous membrane around fistula, adequate mobilization of bladder and vaginal mucous membrane, closure of bladder with interrupted catgut stitches and closure of vaginal layer in the opposite direction from the closure of the bladder are important steps in the operative procedure.

After a de Pezzer catheter is inserted through the urethra the patient is placed face downward on a bent Bradford frame which has been equipped with Albee pads. The Bradford frame is attached to a suitable support and the patient is thus kept elevated above the bed (Fig. 3). The prone position is maintained for a variable period of from seven to fourteen days. The head or foot of the frame can be raised or lowered as needed for the patient's comfort. The catheter, which drains into a basin placed on the bed, is irrigated with solution of boric acid every half hour day and night until the urine is clear; after that, irrigation is performed at increasingly longer intervals. The patient's position and the frequent irrigations insure the absence of pressure on the site of repair. Twice daily the operative site is carefully but fully exposed with a Deaver retractor and the vagina is cleansed with merthiolate and thoroughly dried, as a collection of purulent secretion regularly forms in the vagina and can be most injurious. A nonresidue diet is maintained for at least a week in order to obviate any danger of fecal contamination.

Before the patient is removed from the prone position on the Bradford frame an examination is made in the operating room. A solution of

F.g. 3. Patient in prone position on a Bradford frame supported in such a manner that head or foot can be lowered as desired insures continuous drainage of bladder.

methylene blue is instilled into the bladder under moderate pressure and the efficacy of the repair is noted. If no leakage is noted, the catheter is removed and the patient is allowed to resume activities as she is able. Catheterizations should be utilized judiciously to prevent the bladder from becoming distended. If leakage occurs at the time the methylene blue solution is instilled, it is wise to continue the use of the retention catheter and prone position for some time as often complete closure will ensue.

In order to illustrate the difficulty which may arise in rehabilitating the patient with a vesicovaginal fistula the following case is reported.

Report of Case

The patient, a married woman, registered at the clinic on September 18, 1939. She had had a uterine tumor removed in 1918 and radium treatment both before and after operation. In June, 1933, cystoscopic examination was done and a small growth was removed from the bladder and the base of the growth was cauterized. A few weeks after this the patient stated that she began to pass all of her urine via the vagina. She was hospitalized for two weeks but the fistula failed to close. Operative attempts to close the fistula were made elsewhere in November, 1933, November, 1936, and in February, 1937. Following the last operation, which had consisted of suturing the anterior and

posterior vaginal walls together, a rectovaginal fistula developed. In November, 1938, repair of the rectovaginal fistula was attempted. The result of this operation was fair, as she passed most of the bowel contents in the natural manner.

At the time of admission to the clinic the patient was having considerable pain and periodic episodes of profuse bleeding from the vaginal mucous membrane. This latter was so severe that marked secondary anemia had developed and her general condition was such that immediate hospitalization was deemed necessary.

On September 21, 1939, an examination under penthothal sodium anesthesia revealed a large vesicovaginal fistula which would easily admit the index finger, and a small rectovaginal fistula. There was no urethra. The vaginal mucosa was so macerated from the long continued irritation that the possibility of malignant change was considered. Biopsy, however, failed to reveal any malignant change. Profuse bleeding occurred at the time of this examination which served to emphasize the poor condition of the vaginal mucosa. A period of three weeks was utilized to improve the condition of the vaginal mucosa and the general condition of the patient.

Because of the poor condition of the vaginal tissues it was thought inadvisable to repair the rectovaginal fistula first as is usually done when this condition complicates a vesicovaginal fistula. Consequently, on October 14, 1939, both ureters were transplanted into the sigmoid. Three weeks later plastic repair of the rectovaginal fistula was done and at the same time the bladder was excised through the vagina. Convalescence from the cystectomy was satisfactory but the repair of the rectovaginal fistula was not successful. Therefore, three weeks after the second operation another repair of the rectovaginal fistula was undertaken. This proved to be successful. The patient was in the hospital a little more than three months. Six months after dismissal from our care she was in good condition and found it necessary to empty the rectum about every two and a half hours.

Summary and Conclusions

Data on sixty-one patients with fistula between the urinary tract and vagina have been analyzed and the results obtained from surgical treatment reported. Pre-operative treatment to improve the condition of the vaginal mucosa and the condition of the bladder is important in the ultimate result.

In the operative technic usually employed at the clinic emphasis is placed on the following points: (1) Kraske position with the buttocks elevated during the operation; (2) adequate exposure; (3) adequate mobilization of the vaginal flap and of the bladder with closure with interrupted sutures without tension. The vesical and vaginal openings are closed separately and in opposite directions.

Postoperative care to insure continuous drainage of the bladder is accomplished by placing the patient in the prone position on a Bradford frame.

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MINNESOTA SEROLOGICAL EVALUATION STUDY

A Committee Report

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IN view of the important place occupied today by the serological tests for syphilis, too much emphasis cannot be placed upon: (1) maintenance by the laboratory of the highest possible degree of accuracy in their performance; (2) constant alertness on the part of the clinician in respect to their proper interpretation. The increased trend toward the routine use of the serological tests for syphilis as a part of every physical examination, including the premarital examination already compulsory in nineteen states,[7] multiplies greatly the responsibilities resting upon laboratory and clinician alike.

Evaluation of the serodiagnostic tests for syphilis has been marked essentially by three stages of development:

1. An attempt to evaluate many different methods as performed by the authors or originators themselves, under ideal circumstances. Three of the earliest conferences held for this purpose were conducted under the auspices of the League of Nations Health Organization in 1923,[8] 1928[9] and 1930.[10] The first American conference followed in 1935.[1,2,3]

2. The evaluation of performance in state laboratories comparing results obtained under varying conditions in many different laboratories with those of the author-serologists serving as controls. The first of such studies was made in 1936,[11,12] thirty state, municipal, and private laboratories participating. Out of this has come the annual comparison under auspices of the United States Public Health Service as serodiagnostic tests for syphilis performed by all state laboratories.

3. Evaluation of local, municipal, hospital, and private laboratories within each state by comparison of results with those obtained in the state laboratory. Before undertaking such studies the latter must have attained a satisfactory level of efficiency as determined by the United States Public Health Service evaluation.[5,11,12,13]

Perhaps the greatest value of the League of Nations studies was that they set a precedent and probably stimulated the more significant American studies that have taken place since 1934. Though Eagle[4] and others have pointed out the deficiencies in the League studies as well as the first American study, they served their purpose well. Giving important guidance to all of the American studies is the Committee on Evaluation,[13] formed as a result of a coöperative arrangement between the United States Public Health Service and the American Society of Clinical Pathologists. Thirteen serologists, using thirteen procedures or methods, participated in the first American study, including all those now in relatively common use in Minnesota, i.e., Kolmer, Kline, Kahn, Hinton, Eagle, and Rytz (Lufkin-Rytz). The sensitivity and specificity ratings attained by the above author-serologists were:

Eagle	84.1	98
Hinton	86.6	99.3
Kahn	80.5	100
Kline	76.3	100
Kolmer	75.9	100
Lufkin-Rytz	84.7	98.7

In the second study (1936)[11,12] thirty laboratories (eleven state, five municipal, fourteen private) participated. Fifty-one performances of nineteen separate diagnostic tests were evaluated. Whereas many of the laboratories attained results comparing favorably with the originators of the method, a substantial number were obviously inefficient. In the third study (1937)[13] thirty-nine laboratories participated, entering a total of seventy-four test performances. Only eight laboratories performed a single test, the remainder two or more. The conclusions of the committee were similar to those expressed after the 1936 study, i.e., that many of the state laboratories maintained a high level of efficiency, but far too many were not qualified to perform efficient serodiagnostic service. Recommendations for improvement included strict adherence to technic of orig-

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Assisting the committee in this survey were M. W. Higginbothom, Ph.D., Evaluation Serologist, Minnesota Department of Health, Division of Preventable Diseases, and Marian Wilder, Ph.D., Statistician, Minnesota Department of Health, Division of Preventable Diseases.

inators (many modifications were being used) and provision of adequate training facilities for state and local laboratory technicians.

In 1938, forty-six laboratories representing forty-four states and the District of Columbia participated in the performance of ninety-six test procedures. The results of ten state laboratories approximated the control laboratories; five additional attained satisfactory results; thirty gave unsatisfactory results.

In 1939, thirty-eight state and three Public Health Service laboratories participated in the performance of ninety-seven test procedures (thirty-one complement-fixation, sixty-six flocculation). The ten laboratories approximating the control laboratories in 1938 did not participate; three laboratories approximated the results of the controls; thirteen additional attained satisfactory results; twenty-two state laboratories were unsatisfactory. The criteria for satisfactory performance throughout the recent evaluation studies have been those recommended at the Assembly of Laboratory Directors and Serologists, Hot Springs, Arkansas, October 21-22, 1938.[15]

1. Sensitivity rating (percentage of true positives from known syphilitic donors) not more than 10 points below the control laboratory.

2. Specificity (percentage of negative and doubtful from presumably non-syphilitic donors) must not be less than 99 per cent.

In 1940, for the first time, there was complete representation of all state and District of Columbia laboratories. The results have not yet been published. Judging from preliminary available material, it would appear that there has been a considerable improvement. An analysis of seventy-six standard test procedures (thirty-four Standard Kahn, sixteen Kline diagnostic, seven Eagle, nine regular Hinton, ten simplified Kolmer) reveals that all but sixteen were satisfactory from standpoint of specificity. However, there was a change made in computing the specificity and sensitivity rates in 1940 as compared with the preceding years. Instead of computing sensitivity on the basis of true positives in known syphilitics, credit was given for doubtfuls as:

$$\frac{\text{Positives} + \frac{1}{2}\text{ doubtfuls}}{\text{Known syphilitics}}.$$

This, of course, would raise the sensitivity rating of a number of tests. On the other hand, specificity was computed for the first time on the basis of

$$\frac{\text{Negatives} + \frac{1}{2}\text{ doubtfuls}}{\text{Normal donors}}.$$

Instead of getting full credit for a doubtful, in effect only half a point is given, thus tending to lower the specificity ratings in proportion to the number of doubtfuls encountered. Since many are greatly concerned about the false doubtful as well as the false positive reaction, this change in basis of computation may prove very desirable. The change should be kept in mind, however, in making comparisons between 1940 performance and that of previous years.

Intrastate Evaluation Studies

Although these studies have been in progress in many, if not all, of the states eligible to conduct them, only a relatively few statewide studies have as yet appeared in the recent literature.[14,16] Webb, Sellers and Burney[16] reporting upon the 1939 evaluation study in Georgia observed:

1. Twenty-one of the forty laboratories in the state performing serologic tests for syphilis, agreed to participate in the study on a voluntary basis. The participating laboratories performed 92 per cent of the serologic work in the state exclusive of the State Health Department.

2. Twenty-two laboratories employed Kahn standard, seven a modified Wassermann.

3. Results:

   a. *Kahn*—seven laboratories satisfactory both as sensitivity and specificity.
   Eight laboratories unsatisfactory as to sensitivity, satisfactory as to specificity.
   Two laboratories satisfactory as to sensitivity, unsatisfactory as to specificity.
   Three laboratories unsatisfactory as to sensitivity, unsatisfactory as to specificity.

   b. *Wassermann*—Two satisfactory as to sensivity and specificity.
   Five unsatisfactory as to sensitivity, satisfactory as to specificity.

Minnesota Study

Although eligible to conduct intrastate studies prior to 1939, lack of sufficient funds delayed their organization until that time. At the May, 1939, meeting of the Minnesota State Medical Association, the recommendations of the Hot Springs Assembly of Laboratory Directors and Serologists relative to intrastate evaluation stud-

ies were placed before the councilors and representatives by its syphilis committee. A resolution was passed in favor of a comparative study on a voluntary basis.

Beginning in June, a survey of all laboratories in Minnesota was made to determine how many were performing serodiagnostic tests for syphilis, the types of tests used, and the approximate volume of work done. From this survey it was learned:

1. There were approximately twenty-eight laboratories (municipal, hospital and private), exclusive of the State Department of Health, performing one or more types of serologic tests for syphilis.

2. This included at least ten small hospitals employing a test in the selection of donors, a check specimen being submitted to the State Department of Health laboratories in each case.

3. There were thirteen complement fixation and thirty-four flocculation performances conducted in the twenty-eight laboratories.

On September 29, a meeting of clinical pathologists, with representatives of the University of Minnesota, Syphilis Committee of State Medical Association, and State Department of Health was held to consider the matter. A resolution favoring the study was passed. Following the example set in the national evaluations, a State Serologic Committee was appointed by the State Board of Health at its November meeting. The first meeting of the committee was held December 1 and plans outlined.

Details cannot be given here, but the main points agreed upon were as follows:

1. All laboratories performing serologic tests for syphilis, regardless of size, should be invited to participate at the same time.

2. All tests performed routinely by each laboratory were to be included. Details of technic in respect to every test should be submitted by each participant.

3. One hundred syphilitic donors and 100 non-syphilitic, presumably well, donors were to be used as a basis for the study.

4. The syphilitic donors were to be carefully selected by syphilologists from the syphilis clinics at University Hospital, Minneapolis General, Ancker, and Mayo Clinic, each if possible to contribute twenty-five cases. Evidence supporting the diagnosis should be incontrovertible. Not more than 10 per cent of the cases were to be early, the majority latent and late types treated and untreated, thus assuring a large number with low reagin titer.

5. Non-syphilitic donors would be selected from among University medical students, interns, etc.

6. Both syphilitic and non-syphilitic donors were to be paid at rate of $5.00 per 100 c.c. of blood.

7. No spinal fluids were to be included in the first study.

8. No donors with diseases other than syphilis were to be included in first study.

9. Time of study to cover approximately three months; ten specimens to be sent to each laboratory twice a week.

10. Whole blood to be used rather than serum. Details of collection and shipment to be worked out by State Department of Health. Shipment to be arranged so that specimens would arrive in all laboratories about the same time.

11. Tabulation of syphilitic donors giving age, sex, detailed diagnosis and amount of treatment to be submitted by the staff of each contributing clinic directly to the chairman of the committee at the conclusion of the study.

12. Results to be reported as positive, negative, doubtful on blanks provided for that purpose. However, those laboratories routinely reporting their results in terms of 1-4+ should be permitted to report in such a manner in the study, provided that the appropriate columns (positive or doubtful) were used. Reports were to be submitted to the chairman of the serologic committee.

13. Correlation and evaluation of results deferred for consideration after completion of study.

Conduct of Study

Nineteen of the twenty-eight laboratories elected to participate. It is estimated that more

than 90 per cent of the serological tests done in the state (exclusive of the State Department of Health laboratory) are performed by the laboratories that participated in the study:

TABLE I.

Laboratory	City	No. of Tests
Ancker Hospital	Saint Paul	2
Deaconess Hospital	Minneapolis	1
Fairview Hospital	Minneapolis	1
Mayo Clinic	Rochester	5
Medical Arts Lab.	Minneapolis	1
Miller Hospital	Saint Paul	2
Mpls. General Hospital	Minneapolis	4
Mpls. Health Dept.	Minneapolis	2
Minn. Dept. of Health	Minneapolis	9
St. Lukes Hospital	Duluth	3
St. Mary's Hospital	Duluth	1
St. Mary's Hospital	Detroit Lakes	1
St. Paul Health Dept.	Saint Paul	2
St. Vincent's Hospital	Crookston	1
Swedish Hospital	Minneapolis	3
Univ. Bacteriology Dept.	Minneapolis	2
Univ. Hospitals	Minneapolis	1
Wesley Hospital	Wadena	1
*X Laboratory	Minneapolis	2
Total		44

*Laboratory desired to participate under this identification for special reason.

The study began on January 29, 1940, and was completed on April 3. Forty-four test performances as conducted in nineteen different laboratories were included. Eleven were complement fixation and thirty-three flocculation tests:

Complement Fixation Test	*No. of Laboratories*
Qualitative Kolmer	3
Larson Wassermann	2
Craig Wassermann	2
Kolmer (modified)	1
Kolmer (modified)	1
Kolmer Routine	1
Johns Hopkins Wassermann	1
	11

Flocculation Test	*No. of Laboratories*
Kline Diagnostic	10
Kahn	8
Rytz I	4
Rytz II	1
Hinton	4
Kline Exclusion	1
Eagle	1
Mazzini	2
Meinicke	1
Lauglen	1
	33

Analysis of Syphilitic Donors

An analysis of the syphilitic donors (Table II) indicates that:

1. Approximately 89 per cent were of the late latent, late and congenital types, late latent and neurosyphilis predominating.
2. 85 per cent of the cases had received one year or more of treatment, though not necessarily regular.

Two of the cases, one from syphilitic and one from non-syphilitic group, were dropped from the study because of questionable diagnoses, thus leaving ninety-nine in each group.

TABLE II

Diagnosis	Sex	Length of Treatment in Years				
		Less than 1	1—1.9	2—2.9	More than 3	Total
Primary	M	—	—	—	—	—
	F	—	—	—	—	—
Secondary	M	1	—	1	—	2
	F	1	—	1	—	2
Early latent	M	1	1	—	—	2
	F	1	1	2	1	5
Late latent	M	4	10	3	3	20
	F	1	6	3	2	12
Cardiovascular	M	—	1	—	1	2
	F	1	1	1	—	3
Neurosyphilis	M	4	8	7	4	23
	F	—	5	5	4	14
Other late	M	1	3	1	—	5
	F	—	2	2	—	4
Congenital	M	1	1	—	—	2
	F	—	2	1	—	3
Total	M	12	24	12	8	56
	F	4	17	15	7	43
All		16	41	27	15	99

TABLE III. SPECIFICITY AND SENSITIVITY OF TESTS

Test	Test No.	Specificity Normal Individuals							Sensitivity Syphilitic Cases					
		Pos.	Doubt.	Neg.	Total Run	$\frac{N_1}{T_1}$	$\frac{N_1+\frac{1}{2}D_1}{T_1}$*	$\frac{N_1+D_1}{T_1}$†	Pos.	Doubt.	Neg.	Total Run	$\frac{P_2}{T_2}$	$\frac{P_2+\frac{1}{2}D_2}{T_2}$
Kolmer Qualitative	1	1		98	99	99	99	99	31		67	98	32	32
	2		1	98	99	99	99	100	62	13	19	94	66	73
	3			99	99	100	100	100	87	3	9	99	88	89
Other Complement Fixation	4			99	99	100	100	100	61	10	28	99	62	67
	5	1	3	95	99	96	97	99	61	13	25	99	62	68
	6			99	99	100	100	100	60	9	29	98	61	66
	7			99	99	100	100	100	70	5	24	99	71	73
	8			98	98	100	100	100	43		55	98	44	44
	9	1		97	98	99	99	99	26	5	68	99	26	29
	10			99	99	100	100	100	41	1	57	99	41	42
	11	2		96	98	98	98	98	46	7	46	99	46	50
Kline Diagnostic	12			99	99	100	100	100	85	1	13	99	86	86
	13			99	99	100	100	100	52	43	4	99	53	74
	14		1	98	99	99	99	100	60	34	5	99	61	78
	15			99	99	100	100	100	96	2	1	99	97	98
	16	3	5	91	99	92	94	97	93	4	2	99	94	96
	17	1	5	93	99	94	96	99	52	15	32	99	53	60
	18	18	11	68	97	70	76	81	81	7	10	98	83	86
	19	2		96	98	98	98	98	41		58	99	41	41
	20	7	1	90	98	92	92	93	63	6	30	99	64	67
	21	1	5	93	99	94	96	99	84	7	8	99	85	88
Kahn	22			99	99	100	100	100	65	25	9	99	66	78
	23		1	83	84	99	99	100	51	20	17	88	58	69
	24		1	98	99	99	99	100	85	9	4	98	87	91
	25			99	99	100	100	100	70	14	15	99	71	78
	26		3	96	99	97	98	100	89	3	6	98	91	92
	27	1	4	41	46	89	93	98	18	5	30	53	34	39
	28			99	99	100	100	100	71	4	24	99	72	74
	29	2		96	98	98	98	98	76	6	17	99	77	80
Rytz I	30	4	3	91	98	93	94	96	82	7	10	99	83	86
	31	10	3	86	99	87	88	90	85	2	11	98	87	88
	32	1	1	97	99	98	98	99	88	3	8	99	89	90
	33	10	1	88	99	89	89	90	92	4	3	99	93	95
Hinton	34			99	99	100	100	100	87	9	3	99	88	92
	35		1	98	99	99	99	100	69	29	1	99	70	84
	36			99	99	100	100	100	90	7	2	99	91	94
	37			93	93	100	100	100	78	11	6	95	82	88
Mazzini	38			99	99	100	100	100	94	4	1	99	95	97
	39			99	99	100	100	100	98	1		99	99	99
Rytz II	40	2		97	99	98	98	98	86	5	8	99	87	89
Kl. Excl.	41	3	2	94	99	95	96	97	99			99	100	100
Eagle	42		2	97	99	98	99	100	94	4	1	99	95	97
Meinicke	43			90	90	100	100	100	41		48	89	46	46
Laughlen	44	2		97	99	98	98	98	56	1	42	99	57	57
Total		72	54	4,138	4,264				3,059	358	856	4,273		

Key to Table III

N is number of negatives
P is number of positives
T is total number
1 is normal group
2 is syphilitic group
*Formula used in 1940 for computing specificity in National Evaluation.
†Formula used prior to 1940.

Results of Study

When the complete reports had been received from all laboratories, the committee decided that several methods of evaluating the results should be employed as follows:

In determining specificity:

1. $\frac{\text{Negatives} + \text{Doubtfuls}}{\text{Total Normal Donors}} \quad \frac{N_1 + D_1}{T_1}$
(Method employed in National evaluation prior to 1940)
2. $\frac{\text{Negatives} + \frac{1}{2}\text{ Doubtfuls}}{\text{Total Normal Donors}} \quad \frac{N_1 + \frac{1}{2}D_1}{T_1}$
(Method employed in National evaluation of 1940)
3. $\frac{\text{Negatives}}{\text{Total Normal Donors}} \quad \frac{N_1}{T_1}$
(Used experimentally to determine what effect could be if no credit at all was allowed for a doubtful)

In determining sensitivity:

1. $\frac{\text{True Positives}}{\text{Total Syphilitic Donors}} \quad \frac{(P_2)}{T_2}$
(Method employed in National evaluation prior to 1940)
2. $\frac{\text{True Positives} + \frac{1}{2}\text{ Doubtfuls}}{\text{Total Syphilitic Donors}} \quad \frac{P_2 + \frac{1}{2}D_2}{T_2}$
(Method employed in National evaluation in 1940)

Table III gives a complete tabulation of the results computed according to the above formulæ. It was decided to assign a number to each test procedure rather than to each laboratory since each laboratory was to be provided with a complete summary of the findings of all others participating, together with its own code numbers for identification.

Charts 1, 2, 3 and 4 provide the essential information in graphic form, employing the methods of evaluation adopted by the National Evaluation Committee for 1940. The findings were presented to the committee members in June, for study and recommendations.

Disposition of Results

At a meeting held September 16, 1940, the committee agreed upon the following:

1. Each laboratory should be supplied with a complete tabulation of results together with an individual case analysis of syphilitic donors showing diagnosis, amount of treatment, etc.

2. Approval of plan whereby the State Department of Health evaluation serologist would continue to visit the participating laboratories and render all possible assistance desired in improving their serologic performance. In addition the facilities of the State Department of Health laboratories may be made available to technicians in local laboratories desiring assistance in meeting special problems.

3. In place of the formal type of evaluation carried out in 1940, the 1941 plan, the details of which were to be worked out by the State Department of Health, should provide an opportunity for participating laboratories to systematically compare test performance throughout the year. A schedule providing for the comparison of results on ten specimens per week was believed suitable. Those laboratories having access to a syphilis clinic could arrange for the splitting of specimens by the staff of that clinic; others would have to have specimens sent to them. Results would be reported by each laboratory directly to the State Department of Health,

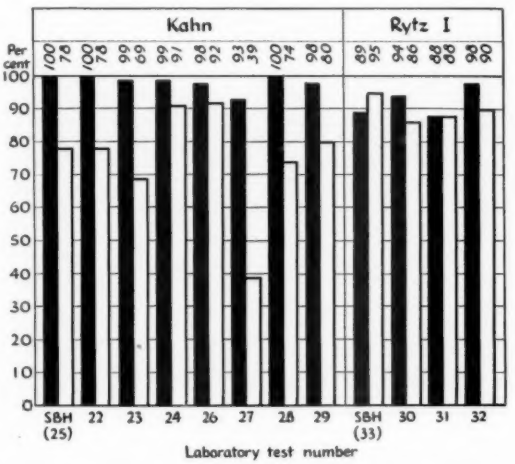

Chart 1. Black areas indicate specificity; white, sensitivity.

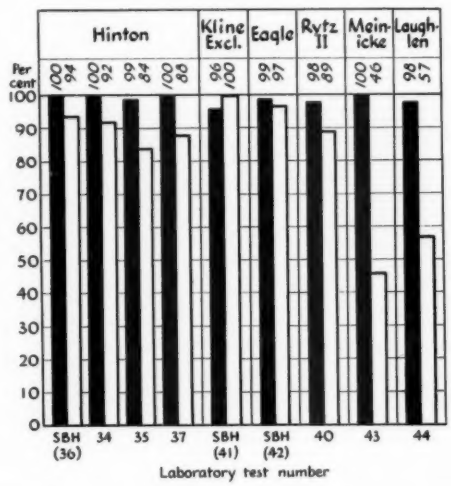

Chart 2. Black areas indicate specificity; white, sensitivity.

Division of Preventable Diseases. The results observed in the state laboratories would in turn be reported to the participating local laboratory.

4. The results of the 1940 evaluation should be published in MINNESOTA MEDICINE. One of

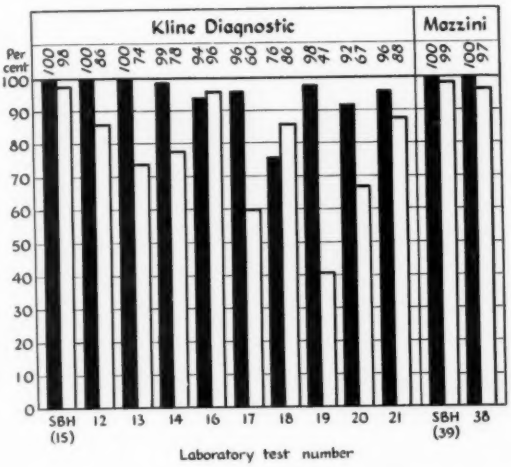

Chart 3. Black areas indicate specificity; white, sensitivity.

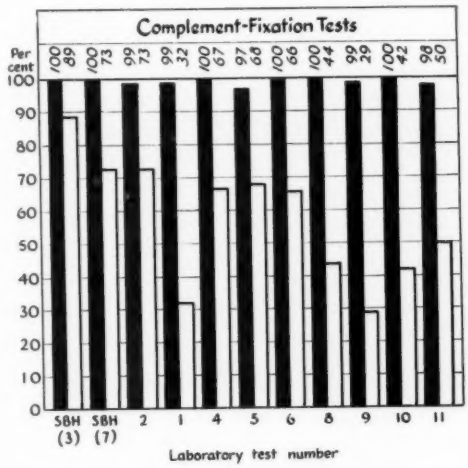

Chart 4. Black areas indicate specificity; white, sensitivity.

us (R.R.S.) was instructed by the committee chairman to prepare this report.

The 1941 Study

The plan advocated for 1941 has been in operation for several months. Thirty-two laboratories, including the State Department of Health, are participating. The schedule is so arranged that each laboratory cross checks with the State Department of Health Laboratory for one week of every month. During this week ten specimens are subjected to comparative examination. No pooled sera are employed under this system, all specimens being of whole blood from known syphilitics, known normals, or individuals available for further study in event of any question as to diagnosis. Although the informal year around plan would appear to have a number of obvious advantages, it cannot be evaluated as yet on the basis of the limited experience with it.

Summary

1. A brief review and analysis of the serological evaluation studies as conducted in the United States since 1934 has been presented.

2. The organization and conduct of the first evaluation study in Minnesota has been discussed.

3. The results of the study have been statistically analyzed, and presented in Table III and Charts 1, 2, 3, and 4 without special comment.

4. Since completion of the 1940 study, many of the participating laboratories have clearly indicated their interest in improving test performance.

5. It is believed that the continuation of such studies and the informal interlaboratory checking will be mutually beneficial to all laboratories participating in them.

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TREATMENT OF INTRACAPSULAR FRACTURES OF THE FEMUR WITH THE SMITH-PETERSEN NAIL*

Report of Twenty-two Consecutive Cases

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ONE of the most noteworthy advances in the field of surgery in the last decade has been the development of the method of treating intracapsular fractures of the neck of the femur by internal fixation after closed reduction. Fixation by metal plates, screws and other devices, has long been known, but until its adaptation to the femoral neck, little progress was made. The improvement in results was soon reflected in statistical reports. Thus, in 1,485 cases, a report of the Fracture Committee of the American Academy of Orthopedic Surgeons[1] shows that union took place in 89.4 per cent, a much higher percentage than has been obtained under any of the older methods. Furthermore the mortality rate was reduced to only 8.5 per cent.

There are two main factors in this treatment which facilitate union: (a) absolute fixation of the fractured ends; (b) unrestricted mobility of the extremity, permitting free circulation. Further advantages may be briefly summarized:

1. There is practically no shock following the operation, and the operation can be done with comparative safety where other types of treatment would be contra-indicated.

2. There is less pain and greater comfort to the patient. The initial pain which follows the operation soon subsides, and as no other immobilization is necessary, the patient is free to move and change position in bed without restraint. After the first few days he may sit up in a chair or be permitted on crutches.

3. The elimination of the prolonged period of immobilization with casts or appliances greatly lessens the likelihood of pulmonary complications, the chief cause of mortality with the older methods.

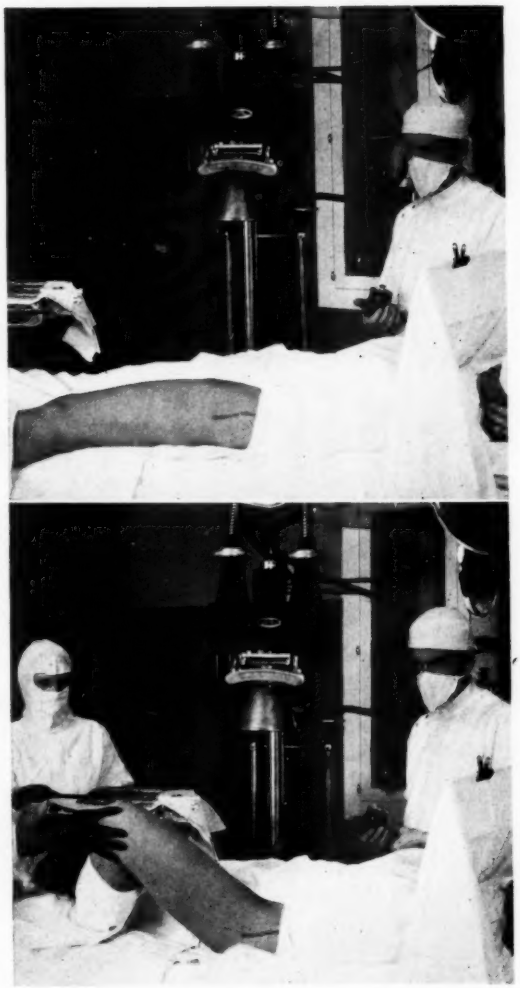


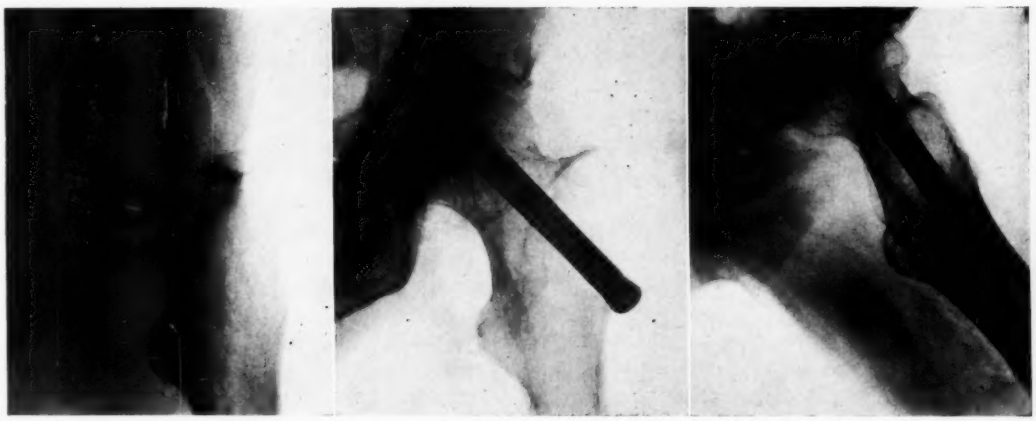
Fig. 1. (*above*) Operative set-up with portable unit in position for anterior-posterior view.

Fig. 2. (*below*) Method of taking lateral view without changing position of equipment.

*Read before the Saint Paul Surgical Society, Saint Paul, Minnesota, February 13, 1941.

3a 3b 3c

Fig. 3. Subcapital fracture. *a*, Before treatment; *b*, antero-posterior film after fixation; *c*, lateral view.



4a 4b 4c

Fig. 4. Transcervical fracture. *a*, Before treatment; *b*, antero-posterior film after fixation; *c*, lateral view.

5a 5b 5c

Fig. 5. Transcervical fracture. *a*, Before treatment; *b*, antero-posterior film three months after fixation; *c*, lateral view.

4. Since almost normal functions of the extremity are possible, with the exception of weight bearing, muscular atrophy and ankylosis of the knee and ankle are avoided.

5. Pressure sores do not develop.

6. Nursing care is rendered less difficult and expense reduced to a minimum, inasmuch as after the incision is healed, the patient may convalesce at home instead of at the hospital.

There are few contra-indications, but as in other surgical conditions, these patients require a careful pre-operative physical examination and an appraisal of their general condition. Most of them are aged and infirm, some are in shock and others dehydrated and still others already have complications such as diabetis and cardiovascular disease. In such cases proper pre-operative preparation is essential.

Preparation of Patient.—Unless otherwise contra-indicated, spinal anesthesia is used. An ordinary operating table is used and before the patient is prepared, he is placed on the well side and the spinal anesthetic is administered. The reason for using an ordinary table is that it is better adapted to this type of operation since no traction is necessary. After the administration of the anesthetic, the patient is again placed on his back and the table is slightly tilted as required for the effect of the anesthesia. An arm board is attached to the lower end of the table for the support of the injured leg, since this is necessary in order to secure proper abduction. A portable x-ray is placed on the well side and a tunnel underneath the hips of the patient, which opens on the same side as the x-ray. It is important that all details be attended to before sterilizing and draping the patient since rigid asepsis is necessary, and once in place, no part of the set-up should be disturbed until after the close of the operation.

The site of the operation is prepared by sterilization with any one of the accepted solutions in use, such as merthiolate, metaphen, or iodine. The whole leg, including the foot, thigh and hip, is prepared. This is done to allow free manipulation in the reduction. While an assistant raises the extremity, sterile sheets are placed underneath and finally the foot and leg are passed through the opening of a lap sheet which is drawn well above the fracture. The fracture is now reduced by the following method: flexion, traction in flexion, abduction and internal rotation. After reduction has been accomplished, the position is maintained by an assistant throughout the operation. Roentgenograms are taken, both in the anterior-posterior and lateral positions. Both views are taken without moving any part of the equipment. The lateral view is obtained by gently flexing the thigh to almost a right angle with the body, at the same time maintaining abduction. If reduction is satisfactory, the operation is begun.

Instruments.—Besides the usual instruments required for an incision and suturing, the following are included: Bailey guide, driver handle, extractor; hammer and bone drill; two Steinman pins and an assortment of Smith-Petersen nails of varying lengths.

Technique.—An incision is made about 3 inches in length over the great trochanter parallel to the long axis of the leg. The muscles are retracted and the bone is exposed. The guide is inserted between the fibers of the vastus externus just below the attachment of this muscle. With the use of the drill, a pin is introduced about 2.5 or 3 inches through the center hole of the block. Pictures are then taken as before and if the position is satisfactory, the guide is removed and a nail of the proper length is threaded over the pin. After attachment the driver handle is introduced to the proper distance, and the guide pin is removed. Additional pictures are taken and if the position of the nail is satisfactory, the wound is closed and the operation completed. No cast or other retentive apparatus is applied.

Postoperative Care.—Postoperative care is as for other major surgical cases. A sandbag may be placed on the outer side of the leg and a cradle to support the bed clothing over the extremity. Active and passive motion in bed may be begun as soon as the primary reaction of the operation is over. Other treatment is as indicated depending upon the individual condition of the patient. Weight bearing should not be permitted until the clinical condition and x-ray pictures indicate union. Very little, if any, callus occurs and the extent of bony union can only be judged by the obliteration of the fracture line

and the appearance of bone trabeculation in the roentgenogram.

Results.—There are twenty-two consecutive cases reported in this series. The average age is 66.5 years, the youngest being forty-four and the oldest ninety. There were no infections and no operative deaths. The time of operation after the fracture varied from one day to six and a half, in most instances within the first week after the injury. Pulmonary emboli occurred in two patients with recovery in both instances. Phlebitis was present in two, mental confusion in one, and cardiac-decompensation in one. Non-union occurred in three patients on one of whom a reconstruction operation has been done. The other two will remain untreated on account of age and other infirmities.

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TREATMENT OF NEUROLOGIC CHANGES COMPLICATING PERNICIOUS ANEMIA*

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SINCE the salient aspects of the treatment of the neurologic changes that complicate pernicious anemia are generally known, we shall depart from the usual custom of an oblique introductory approach and come to the point at once. Thereafter, we should like to discuss some considerations of the subject that are commonplace but which are yet relevant and not unimportant.

All are agreed that if irreparable damage to the nervous system is to be avoided, treatment must be begun at the earliest possible moment. The number of physicians who insist that anything other than liver extract administered parenterally in adequate doses is of material importance, is decreasing steadily. We cannot offer, on the basis of our own material or experience, an analysis of the therapeutic results or of the relative merits of either the more or the less concentrated extracts. Sturgis and his colleagues preferred the less concentrated preparations, whereas Murphy and Howard preferred the concentrated preparations, even for the treatment of the neurologic disturbances. Whether the relative merits of the more or the less concentrated preparations have been investigated in parallel series of cases we do not know.

We have used two types of preparations. Of the less concentrated preparations, of which we have used one containing 1 unit of anti-anemic material per cubic centimeter, we administer 10 c.c., intramuscularly, in divided doses during the first three days and, thereafter, 3 c.c. every five to seven days. When we use the more concentrated preparations (containing 15 units per cubic centimeter), we inject 1 c.c. three times during the first week; thereafter, 1 c.c. every five to seven days. If in two months there has been no evidence of improvement we double the dose or shorten the interval of administration. Should infection occur or extra demands be thrown on the patient, the dose of liver extract should be doubled. If improvement occurs, we continue to inject liver extract until all neurologic manifestations have disappeared, after which the interval between injections may be gradually increased.

The maintenance of an erythrocyte count of 5,000,000 in each cubic centimeter of blood will serve, according to Murphy and Howard, to indicate that the nervous system is being protected adequately. Some authors concede that an erythrocyte count of 4,500,000 is a safe minimum, but in the final analysis, the nature of the neurologic picture must serve as the guide. The intensity of the neurologic symptoms is no criterion of the prognosis, but the duration of them is a criterion. Hyland and Farquharson, whose survey of subacute combined degeneration we can endorse warmly, found no improvement in the treatment of neurologic disturbances that had been present for more than four years. Ungley suggested that two years be accepted as the critical period, before the end of which much may

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be hoped for, and after which there occurs a steadily decreasing prospect of improvement. These observations are in keeping with neurologic experience.

An appraisal of the gross results of therapy was offered by Hyland and Farquharson. Of seventy-four cases, in forty-one, or 55 per cent, there was marked improvement, and in an additional sixteen, or 22 per cent, there was moderate improvement, which produces a total of 77 per cent. It may be proper to deduct from the seventy-four cases eight in which death occurred shortly after admission of the patients. If this were done, the proportion of cases in which improvement occurred would be increased to 86 per cent. With such deduction continued, in half the sixteen cases in which the neurologic complication was severe, there would result an improvement which could be classified as "marked." It is apparent from the table of Hyland and Farquharson that the most marked improvement was obtained in cases in which the condition was mild or moderately severe.

Their analysis disclosed that the greatest improvement took place from the third to the sixth month, and that the situation became relatively stationary by the second year.

In sixty-six cases they found that the symptoms and signs which responded best to treatment were paresthesia, impairment in joint sense and gait, impairment of superficial sensation and disturbance of sphincteric control. Psychic disturbance also usually improved. Least responsive to treatment were impairment of vibratory sensation, an extensor plantar response, and absence or diminution of the Achilles tendon reflexes.

Excellent functional recovery may occur even when the pathologic changes in the spinal cord are marked, as has been shown among patients who have died from intercurrent diseases. In the spinal cords of patients who have been treated with liver extract, the characteristic ballooning of the myelin sheaths is not seen and a well-developed fibrillar glial scar is present.

So far as we know, a study of the brains of patients suffering from pernicious anemia who have received adequate treatment with liver has not been made. It is often said that changes in the brain do not occur so commonly in the presence of pernicious anemia as do changes in the spinal cord. This is not so; what actually happens is that the Lichtheim foci are not discovered so easily and are not sought so often, adequate examination is time-consuming and costly and the results of secondary degeneration do not become so obvious in the brain as they do in the spinal cord.

A few writers have advocated complete rest in bed for the patient during the first three months of treatment. From the neurologic standpoint we can see little to be gained by this procedure. Just how much can be achieved by physical therapy, including infra-red radiation, contrast baths, sedative massage, and, especially, muscle-training exercises, it is difficult to appraise. Many patients improve without such therapy, but there are patients in whom the damage done to the spinal cord is beyond repair. When this occurs, physical therapy should be given a long and patient trial.

The bladder, too, may need attention. When catheterization becomes necessary, the administration of 5 to 7 grains (0.3 to 0.45 gm.), four times daily, of a sulfonamide preparation, such as sulfathiazole, may be of help, and the assistance of a urologist may add greatly to the patient's comfort and safety.

The infrequent appearance of retrobulbar neuritis may not be dismissed by saying simply that it is due to pernicious anemia. The records of five such patients, seen by us in the course of the five years prior to this report, are complicated and we shall not attempt to give any of them in detail. Two of five patients were more than seventy years of age. In four cases subacute combined degeneration of the spinal cord was present; in one this was only slight, and in one the patient had recovered from it before the central scotoma had appeared. Four patients used tobacco to excess; three of these four had hypertension, and two of these also had severe diabetes. In two cases there was some improvement in vision, but in none did it become normal. We should say, however, that the visual disturbances of all these patients had been present for six months or longer, and we do know that, whatever the cause of retrobulbar neuritis, it should be treated early. Although this is a small series of cases, it does seem likely that pernicious anemia, uncomplicated and by itself, seldom causes retrobulbar neuritis.

Trophic ulcers are rare and for this reason need not detain us long. Lasch described a case

of pernicious anemia in which symmetric, indolent ulcers were situated on the lateral aspects of the legs. On treatment of the patient with liver these healed promptly.

We should like now to deviate slightly from the subject and to discuss some considerations which are taken for granted and some which are controversial. Some writers whose observations demand respect are of the opinion that vitamin B_1 or components of the vitamin B complex are responsible for the healing of subacute combined degeneration. Ungley pointed out, however, that the liver preparation of Dakin and West contains no vitamin B_1, yet it is helpful in the treatment of the neurologic disabilities of pernicious anemia. A preparation of brewers' yeast was given a long and thorough trial, and was discarded. Since purified preparations of several components of the B complex are now available, it is probably safe to assume that the administration of these alone does not cure the characteristic lesion of the spinal cord caused by pernicious anemia; otherwise they would already be in current use. It is true that experimental evidence, gained from work on animals, might be cited as contradicting this view, yet, impressed as we may be by results of animal experimentation in this field, it is a field in which particular care is called for in the formulation of conclusions and transference of them to the particular problem in the human being.

Our attention was attracted by a remark made by Ungley. "The diagnosis of pernicious anemia," he said, "should be carefully made before the patient is subjected to the prescription of a treatment for the rest of his life." This applies also to the diagnosis of subacute combined degeneration of the spinal cord.

More than sixty associated conditions or causes have been advanced to explain combined degeneration that often is said to be "just like that of pernicious anemia." If a reasonably typical clinical picture of subacute combined degeneration as it is seen in pernicious anemia is insisted on, and if a reasonably consistent pathologic picture is demanded, the situation resolves itself into something like this: The funiculi of the spinal cord may be altered by many diseases and in many ways. On the basis of a survey of the important available literature, it appears that this familiar and challenging picture may be brought about by chronic alcoholism (although five of six of Nonne's patients may well have had pernicious anemia), gastric carcinoma (especially of the pylorus), obstruction and fistulas of the intestinal tract, pernicious anemia, so-called prepernicious anemia and scurvy (but in this particular instance it may have been a complication). Possibly, it may be related similarly to pancreatitis, pellagra and hemolytic icterus, and it has been associated in some manner, possibly accidentally, with amyotrophic lateral sclerosis and a number of unclassified diseases. An important physiologic principle appears to be involved. Careful hematologic studies, gastric analysis and an investigation of the presence of Castle's factor probably would lead to the disclosure of some one underlying cause, presumably nutritional and in the nature of a deficiency state. In short, it might be postulated that an absence of Castle's factor probably is the only cause of the typical clinical and pathologic picture of subacute combined degeneration of the spinal cord.

In reviewing our group of approximately 2,000 cases in which the neurologic condition had been classified as "combined sclerosis" or "subacute combined degeneration of the spinal cord," we excluded all cases in which gastric analysis had revealed the absence of free hydrochloric acid. Thus, most, if not all, cases of pernicious anemia were eliminated.

There remained seventy-seven cases in which there were signs of involvement of the posterior and lateral columns of the spinal cord and in which free hydrochloric acid was present in the gastric contents. When to the objective signs is added the history of gradually developing, symmetric, persistent paresthesia of the hands and feet, the clinical neurologic picture becomes that seen typically in cases of pernicious anemia. There were eight cases in which these symptoms were present; in three of these there was no reason for believing that a nutritional factor had entered into the cause; in the remaining five there was reason for thinking so, although we do not venture to say that a pathologic examination in these cases would have disclosed classic subacute combined degeneration of the spinal cord. To borrow a term from the serologic laboratory, occasional "false positive results," which are indistinguishable clinically at a given time from those of the picture typically seen in cases of pernicious anemia, may be met. In cases in which the diagnosis is doubtful, examination of the spinal

fluid increases the accuracy of the diagnosis. In none of these cases could the exact pathologic nature of the lesion in the spinal cord be verified.

The important neurologic signs or symptoms which may be observed occasionally in cases of sprue, nontropical sprue and idiopathic steatorrhea, and which are dependent on organic involvement of the nervous system, usually express themselves as persistent acroparesthesia, depression of the tendon reflexes (especially those of the lower extremities), impairment of vibratory sensibility, as observed over the iliac crests and malleoli, and impairment of postural sensibility in the toes. In one of our cases the clinical observations were those of subacute combined degeneration of the spinal cord, and if persistent paresthesia may be so interpreted, degeneration of the peripheral nerves (although the tendon reflexes were not impaired). These clinical signs disappeared after the intensive intramuscular administration of liver extract.

Obviously, there are cases in which signs of degeneration occur in the posterior and lateral columns of the spinal cord, and yet one would hesitate to refer to them as "subacute combined degeneration" of the type seen in pernicious anemia. What is to be done in such cases? Although gliosis occurs in long-standing instances of subacute combined degeneration of pernicious anemia, it is not the reparative type of fibrillar gliosis that neurologists are accustomed to see in the presence of other lesions of the central nervous system. Hassin made the pertinent suggestion that these be called "combined sclerosis." This term, it seems to us, not only is useful, but also embraces the essence of the situation.

It would be proper to ask, "How would you distinguish the two conditions?" This is not always easy; indeed, if we could always do this we could save much hepatic substance, since, we venture to assert, the one condition responds to treatment with liver whereas the other does not. The cardinal distinguishing features, we should say, are the paresthesias; not only paresthesias, but persistent paresthesias, paresthesias not only in the feet but also in the hands, and not only on one side, but on both sides. It has been said, "The frequency with which numbness, tingling or pins and needles sensations are met with in severe anemias of whatever etiology or in vascular diseases unassociated with anemia, renders these subjective symptoms of little diagnostic value." With this assertion we do not find ourselves in entire accord.

Although involvement of the pyramidal tracts may dominate the picture, as evidenced by marked spasticity, we should be reluctant to make the diagnosis of subacute combined degeneration under such conditions. Also, we should be cautious whenever the findings are unusually asymmetric, for situations of this kind are encountered more often in combined sclerosis. The identification of multiple sclerosis may cause difficulty. The history of a previous disturbance of vision, such as transitory amblyopia or diplopia, and examination of the spinal fluid, may be helpful.

Since we have embarked on a rather pragmatic method of expression of this message, we are tempted to utilize it further. An impairment in vibratory sensibility is the most striking objective symptom in subacute combined degeneration A good tuning fork without a very audible sound and with a long duration of vibration is not easy to find. A fork having 256 vibrations per second is not so slow and coarse as to make the detection of minor impairment too difficult, nor yet so fast and fine as to make transmission to the bone, because of the integument, unreliable. The important factor is that the neurologist become acquainted with some one fork. A good way to begin is to place the fork on the patient's sternum and to make it clear to him just what is expected. Four regions, at least, should be tested: the sternum, the fingers, the anterior superior spines of the ilia, and the internal malleoli. Often the fork cannot be felt when it is placed over the malleoli, but it can be felt when it is placed over the iliac spines. When this occurs the neurologist must rely on other signs to decide whether the lesion is in the spinal cord or in the peripheral nerves. Impairment at the iliac spines suggests that the spinal cord is involved. Sometimes, forks provided with slots are used so that the duration of time over which the fork can be felt may be determined, or, the patient may be asked to notify the examiner at the moment the fork stops vibrating while it is being held to a part. Lack of attention or the nature of the paresthesias may make it difficult for the patient to do this. A procedure which seems to work reasonably well is that in which the fork or the finger of the examiner is placed at irregular intervals on the part examined, and

in which the patient is asked to report simply whether or not he feels the vibration. The residual vibration then may be determined by the placing of the fork on the examiner's own body.

This brings us to the question as to whether the symptoms and findings are not largely due to involvement of the peripheral nerves. The strongest clinical evidence in favor of this is that paresthesia usually begins in the terminal parts of the extremities, that impairment of the Achilles tendon reflexes is relatively greater than that of the patellar reflexes, and that there is peripheral sensory loss, which is sometimes marked. On the pathologic side are the observations of Hamilton and Nixon, who found marked degeneration of the peripheral nerves of patients who had pernicious anemia and once even found that the spinal cord was normal.

On the other hand, it is known that paresthesia of the distal parts of the extremities may occur in the presence of lesions of the central nervous system, such as tumors of the spinal cord. Again, often the paresthesia of pernicious anemia may creep up, so to speak, to involve the trunk. It is noteworthy, however, that the various types of truncal paresthesia often are of a different quality than those of the hands and feet. Possibly this difference may have a normal anatomic or physiologic basis, or it may be that simultaneous involvement of the central and peripheral nervous structures may bring this to pass. It should not be forgotten that in the presence of multiple peripheral neuritis paresthesias sometimes involve the trunk. To this may be added the fact that palsy or paralysis of the peripheral segments of the limbs and significant tenderness usually are lacking in pernicious anemia. Finally, the paresthesias of peripheral neuritis usually disappear after successful treatment; this is not always the case in pernicious anemia.

The work of Greenfield and Carmichael throws further light on this vexing problem. They found, on examination of the peripheral nerves in cases of subacute combined degeneration, a great difference in measurements as well as in counts of myelin sheaths in the nerves. Most of these sheaths were small and of poor staining quality. Examination of the axis cylinders, however, disclosed neither reduction in number nor alteration in the appearance of nerve fibers. That these changes in the myelin sheaths may produce paresthesia is not unlikely and that they do not produce paralysis similarly is not unlikely. We are probably not begging the issue by assuming that both peripheral and central lesions contribute to the clinical picture.

Summary

The symptoms that take place in the nervous system of most patients who have pernicious anemia are not at first caused by an anatomic break in the axis cylinder, but are related to edema, ballooning of myelin sheaths and other subtle processes. These symptoms are reversible when adequate treatment with liver is introduced. The initially focal changes eventually interrupt the anatomic continuity of the axis cylinder, and secondary degeneration is superimposed. When this occurs in the central nervous system, regeneration does not take place. The importance of early institution of treatment is apparent. Physical therapy, especially muscle-training exercises, is helpful. This applies particularly to patients who have not received early and adequate treatment.

The importance of an accurate diagnosis and of distinction between subacute combined degeneration and combined sclerosis has been emphasized. The diagnosis may be uncertain and in such cases results of lumbar puncture and jugular compression tests may be decisive. The farther the neurologist allows himself to deviate from the typical picture, the more likely he is to fall into error.

Finally, the question of the participation of the peripheral nerves in the production of the clinical picture has been described, and the opinion was ventured that involvement of these nerves does contribute to the clinical picture, but to a limited degree only.

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STAPHYLOCOCCUS AUREUS MENINGITIS WITH RECOVERY

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STAPHYLOCOCCIC septicemia, of itself, is not a particularly rare disease and since the advent of treatment with the sulfonamide group of drugs, especially sulfathiazole, recovery therefrom is fairly frequent. Herrell and Brown[11] reported forty-six cases of staphylococcus aureus septicemia treated at the Mayo Clinic prior to the use of sulfamido drugs with twelve recoveries, and twenty-seven cases treated with the sulfamido drugs with fifteen recoveries. Spink and Hansen[20] reported fifteen cases of staphylococcic sepsis treated with sulfathiazole with recovery of all.

Staphylococcic meningitis, on the other hand, occurs infrequently and recovery rarely occurs even with the best present day treatment. Findlay and Hammell,[8] Pewterbaugh,[16] Michels and Gonne[15] and others have stressed the high mortality in this disease. Findlay and Hammell[8] in 1939 stated: 'We feel that patients who have recovered from such a serious disease, deserve to have their cases reported in the literature for the help and guidance of others."

Michels and Gonne,[15] who reviewed the literature in 1938, found only eight cases of recovery from staphylococcic meningitis. The majority of these cases were not true generalized meningitis but were more characteristic of Schless' group I.[19] Since then, other scattered cases have been reported, most of them treated with the sulfamido drugs. The most recent article by Sadusk and Nielsen[18] in January, 1941, gave only twelve reported cases of recovery from the disease. The reported cases of staphylococcus aureus meningitis with recovery and the treatment used in each case are summarized in Table I.

TABLE I. REPORTED CASES OF RECOVERY FROM STAPHYLOCOCCUS AUREUS MENINGITIS AND TREATMENT USED

Author	Year	Treatment
Barker[1]	1925	Symptomatic
Lamb[13]	1928	0.1 per cent gentian violet
Stout[21]	1931	Bacteriophage and transfusion
Schless[19]	1932	Bacteriophage
Dunlap[7]	1935	Bacteriophage and 1:4000 acriflavin
Bliss and Hermann[2]	1936	5 per cent methyl rosaniline
Jackson[12]	1937	Cisternal and lumber punctures, blood transfusions and dextrose solution intravenously
Fritz and Hollister[9]	1938	Staphylococcus antitoxin, sulfanilamide, and blood transfusions
Bloch and Pacella[3]	1938	Sulfanilamide
Michels and Gonne[15]	1939	Sulfanilamide
Findlay and Hammell[8]	1939	Sulfanilamide
Pewterbaugh[16]	1939	Sulfanilamide and staphylococcus antitoxin
Gill[10]	1940	Sulfapyridine
Dietel and Kaiser[6]	1940	Sulfathiazole
Sadusk and Nielsen[18]	1941	Sulfathiazole and sodium sulfathiazole

There have been such a small number of cases reported over a relatively long period of time, all treated by different workers, that there is, as yet, no standard treatment for staphylococcus aureus meningitis. In recent years the sulfamido drugs have been used with encouraging

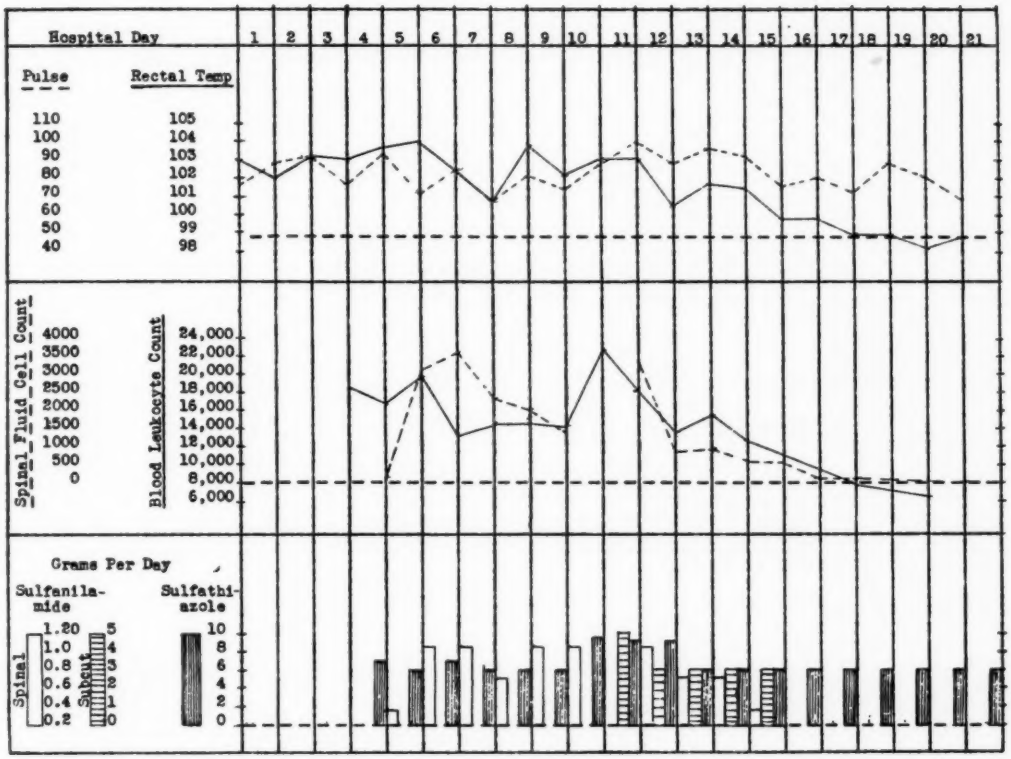

Chart 1. Graph showing range of temperature and pulse, spinal fluid cell count, blood leukocyte count, sulfanilamide and sulfathiazole therapy.

results. Accurate data on the incidence of staphylococcic meningitis is lacking. However, it is significant that in the three years since sulfamido drug therapy has been used in this condition, eight cases of recovery are reported, while previous to 1937, with all other forms of treatment, only nine cases of recovery were reported.

Schless[19] classified staphylococcic meningitis into two groups: (1) those cases, characterized by abscess involving the meninges and resulting from an extension of suppuration in a contiguous structure; (2) those characterized by meningitis with a positive staphylococcus aureus culture in the spinal fluid and negative or positive blood culture. According to Schless, recovery is extremely rare in cases which may be classified in this latter group.

The infrequent occurrence of staphylococcic septicemia and meningitis with recovery and the developmental state of the therapy in this disease lend medical interest to the following case report.

Case Report

C. P., a twenty-eight-year-old man of French-Indian descent, was first seen at the Reformatory Hospital on March 4, 1940, when he received his routine examination upon admission to the institution. There was nothing significant in his past history and his family history was negative. Examination revealed a large, well developed, well nourished male of dark complexion in apparent good health; no physical defects were noted. A urinalysis was negative. His blood pressure was 130/62. The Kline exclusion test was negative and the Mantoux test was negative after forty-eight hours. He was assigned to work on one of the construction crews and during the summer months was a star outfielder on the institution baseball team.

On the afternoon of October 26, 1940, he developed severe aching pain in the joints, particularly in the knees and in the lower back. In a short time he became feverish and began to have chilly sensations. On October 27, he felt worse and when undressing that evening he noticed an eruption on his upper arms and shoulders. He was then admitted to the institution hospital.

At that time he appeared feverish but not extremely

ill. The only positive findings not noted on admission to the institution were as follows:

1. The presence of a temperature of 102.4° F.

2. A skin eruption consisting of numerous red macules, one-half centimeter in diameter, with a tiny, pin-head size pustule in the center of each, distributed over the upper chest posteriorly, the upper part of the arms and shoulders, and on the lateral aspects of both hip joints.

3. A soft pre-systolic murmur at the apex of the heart.

These findings and the symptom of severe aching in the joints and back indicated a tentative diagnosis of acute rheumatic fever with erythema multiforme. He was put to bed and given twenty grains of sodium salicylate every four hours. There was very little change in his condition on October 28, but on October 29 it was definitely worse and obviously was not a case of rheumatic fever. His temperature was 103.2° F.(R). He still complained of severe backache. The pustules which had been the size of a pin-head, located in the center of a red macule, had increased in size until the lesions were entirely pustular. There was also a considerable increase in the number of these lesions.

The clinical picture was that of staphylococcic septicemia. Treatment with sodium salicylate was discontinued and a blood culture was taken. On October 30 his condition remained unchanged. His fever and bachache continued. The leukocyte count was 18,500 and the erythrocyte count was 4,600,000. Hemoglobin was 79 per cent, Sahli. Without waiting for the blood culture report, treatment was started with sulfathiazole, orally. An initial dose of four grams was given and was followed with one gram every four hours thereafter. That evening he began to complain of headache which gradually became worse until at 2:30 a.m., October 31, he required morphine for relief. At that time he had a slightly stiff neck and a spinal puncture was done. The fluid seemed to be under somewhat increased pressure and was slightly cloudy. The cell count was 150 per cubic millimeter with 90 per cent polymorphonuclears. Ten hours later, when a second spinal puncture was done, the pressure was 20 mm. of mercury, the fluid was quite cloudy and contained 1,359 cells, of which 85 per cent were polymorphonuclears. At this time the blood culture taken on October 29 was reported strongly positive for staphylococcus aureus. That evening meningeal symptoms became more marked; the neck was rigid and there was a bilateral positive Kernig sign. His temperature was 104.2° F. (R). Since a purulent meningitis had developed subsequent to the institution of sulfathiazole therapy, and was progressing, and since the work of Sadusk and Blake[17] showed that sulfathiazole does not readily diffuse into the spinal fluid, sulfanilamide was then given intrathecally. Forty to fifty c.c. of spinal fluid were removed every eight hours and replaced with 30 to 40 c.c of a 1 per cent solution of sulfanilamide. There was very little change until November 3 when the patient seemed definitely improved. His temperature had declined to 100.8° F. (R) and the skin lesions were beginning to dry up and disappear. Although the neck was still very rigid and the Kernig sign was still present, the leukocyte count was down to 13,400 and the spinal fluid contained only 940 cells per cubic millimeter. That day only two spinal punctures were done in 24 hours and on November 4 he was very much worse. His temperature was 103.8° F. (R); meningeal symptoms were more marked and headache was more severe. The spinal fluid contained 2,000 cells per cubic millimeter. The eight hour schedule of spinal piunctures with administration of sulfanilamide was therefore resumed.

On November 5 his condition becoming steadily worse, the dose of sulfathiazole was increased to two grams for one dose followed by one and one-half grams every four hours thereafter. Although the blood had been rapidly sterilized of organisms (a second blood culture taken two days atfer instituting sulfathiazole therapy was reported negative), the meningitis appeared to be progressing unfavorably. On November 6 his condition was critical. His temperature was 103° F. (R). He was very weak and irrational and the spinal fluid was so thick that it would not drain from the spinal puncture needle. Being unable to give more sulfanilamide intraspinally and not wishing to give it orally in addition to sulfathiazole, a one per cent solution of sulfanilamide was given by hypodermoclysis; 500 c.c. was given that day and 300 c.c. on each of the next four days. On November 7 the spinal fluid was much thinner and the intrathecal route was again utilized for sulfanilamide administration. His condition continued to improve gradually. On November 8, the dosage of sulfathiazole was decreased to one gram every four hours. By November 10 he was greatly improved. His temperature was 101.4° F. (R). His neck was no longer stiff. The spinal fluid contained only 597 cells per cubic millimeter. At this point sulfanilamide was discontinued. The temperature fell to normal November 11, then rose slightly; again returned to normal November 12 and thereafter remained normal. The spinal fluid cell count, however did not reutrn to normal until November 16. A dose of one-half gram of sulfathiazole orally was continued every four hours for two weeks to prevent the possibility of a recurrence.

Although the patient lost considerable weight during the acute illness he recovered rapidly. Daily determinations revealed no more depression of the red blood cell count than one would expect with any severe infectious disease. Cyanosis was never a prominent symptom in spite of very large doses of both sulfathiazole and sulfanilamide. Liquid Citralka (Parke-Davis) was given in one dram doses every four hours to combat any tendency to development of acidosis. Urinary retention was a problem for several days during the acute stage when he had to be catheterized regularly, but repeated urinalyses were negative. Complete recovery occurred without complication and he was discharged from the hospital January 15, 1941.

Comment

In view of more recent investigations, the combined dosage of sulfanilamide and sulfathiazole used in treating this case may seem unnecessarily large. However, in a disease with such a high mortality rate and wherein a standard effective dosage of the drug is not established it is justifiable to overmedicate as long as toxic reactions to the drug do not supervene.

It is possible that the development of meningitis in this case might have been prevented had the septicemia been evident sooner and treatment with sulfathiazole started more promptly. Gill's case was similarly mistaken for rheumatism and treated with salicylates before the correct diagnosis was made.

Spink and Hansen[20] have demonstrated that sulfathiazole is the most effective known agent in the treatment of staphylococcic septicemia but this drug has not been materially efficatious in the treatment of meningitis. Dietel and Kaiser[6] have reported the successful treatment of one case of staphylococcic meningitis with sulfathiazole alone, but there has, as yet, been no duplication of this result. In our case, although the septicemia responded rapidly to treatment with sulfathiazole (blood culture negative after forty-eight hours and rapid healing of skin lesions), the meningitis did not improve. Sadusk[17] and coworkers found that sulfathiazole does not readily diffuse into non-inflammatory cerebrospinal fluid. Spink and Hansen[20] found the same to be true in purulent fluids and this latter finding was confirmed by Sadusk and Nielsen.[18] From these findings it follows that sulfathiazole will not be very effective in meningitis.

Although much experimental work indicates sulfanilamide is ineffective against staphylococcus aureus both in vitro[4] and in mice,[5] nevertheless, clinically in man, sulfanilamide has proven to be definitely effective in staphylococcic infections. Six of the reported cases of recovery from staphylococcic meningitis were treated with this drug.

Sadusk and Nielsen's[18] report of a case of staphylococcus meningitis successfully treated by the combined administration of sulfathiazole orally and sodium sufathiazole intraspinally and intravenously holds out great promise that the latter drug may prove to be as effective in meningitis as sulfathiazole is in septicemia. Meantime, however, it seems wise to combine the oral administration of sulfathiazole with the intrathecal administration of sulfanilamide in the treatment of staphylococcic meningitis.

Summary

1. A brief review of the literature on staphylococcic meningitis is presented.

2. A case of staphylococcic septicemia and meningitis is reported.

3. Though sulfathiazole sterilized the blood within forty-eight hours, it did not appear to alter the course of the associated meningitis.

4. The oral use of sulfathiazole combined with the intrathecal administration of sulfanilamide proved effective in this case.

5. No toxic reactions developed from the combined use of these two drugs and complete recovery from the disease was effected without complications.

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CLINICAL-PATHOLOGICAL CONFERENCE

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Frank C. Andrus, Pathologist

GENERALIZED LYMPHOSARCOMA

The case is that of a fifty-nine-year-old white woman who was first admitted to the hospital on November 30, 1940, where she was a patient on the Neurological Service for six days. There it was learned that she had been perfectly well until on the day of admission, when she had a series of attacks of epileptiform seizures which were followed by a period of unconsciousness. She had never hand any convulsions previously. She was examined by her private physician, who told her that she had high blood pressure and advised that she come to the hospital. Her past history revealed that she had had the usual childhood diseases. There had ben no surgical operations or any injuries. She denied venereal disease. She had never complained of headaches or fainting spells. There was no blurring of vision, diplopia, or tinnitus. Recently she had had some dyspnea on exertion but no orthopnea. For the past two weeks the patient's appetite had been somewhat decreased. Further history was irrelevant.

When the patient was first seen in the hospital, she was in a state of epileptiform seizure which lasted about two minutes. Following the attack she remained in a semi-stuporous condition for about two hours. When she awoke she was clear mentally. The patient was a well developed and very obese woman. The pupils were equal and reacted to light and accommodation. Examination of the chest revealed a few moist râles at the bases of both lungs. The cardiac dulness was slightly enlarged to the left. A systolic murmur was heard at the apex of the heart. The rhythm was regular and the pulse rate was 90 per minute. The blood pressure at this time was 150/94. The abdomen was extremely obese. No abdominal masses were noted, although the examiner was handicapped because of the extreme thickness of the abdominal wall. There was no abdominal tenderness. The left leg was larger than the right and there was a two plus pitting edema on the left and minimal edema on the right. Neurological examination was done after the patient regained consciousness but no abnormalities whatsoever were found. The ocular fundi were normal.

Laboratory findings were reported as follows: The urine had a specific gravity of 1.018. It contained a faint trace of albumin but no sugar. There were no casts or erythrocytes, and only an occasional pus cell per high power field was seen. The hemoglobin was 70 per cent; the erythrocyte count was 3,800,000 per cubic millimeter; the leukocyte count was 6,350 with a normal distribution. The fasting blood sugar was 106 mg. per cent.

On the first hospital day, the patient had two more convulsions, despite sedation, which lasted about two minutes each. These were followed by short periods of semi-consciousness but left no permanent residual effects. Following the first convulsive seizure, the blood pressure was 250/96 and following the last seizure it was 170/70. Treatment in the hospital consisted of further sedation and limited activity. No further convulsions occurred and the patient was discharged on the sixth hospital day with a tentative diagnosis of idiopathic epilepsy.

The patient was then followed in the Out Patient Department where it was noted that a mass was present in the abdomen. On pelvic examination it was found that there was some thickening of the anterior vaginal wall. She was readmitted to the hospital on December 14, 1940, in order that a biopsy of the vaginal mass might be done. She now stated that since her discharge from the hospital, she had experienced pain in the lower part of her abdomen and had lost some in weight. Physical examination was essentially the same as on the previous admission. The blood pressure was now 142/88. Examination of the abdomen again revealed the marked obesity but the abdominal wall was now relaxed. A mass seemed to rise from the pelvis to about the level of the umbilicus. It was described as being very hard and irregular in outline. The liver was palpable four centimeters below the costal margin in the right midclavicular line. It was not tender. There was three plus edema of the entire left lower extremity. Pelvic examination revealed normal external genitalia. There was a very firm, nontender mass in the region of the anterior vaginal wall. It seemed to be attached to the mass in the abdomen. There was no uterine or vaginal bleeding.

Laboratory Findings.—The urine was negative save for a faint trace of albumin. The hemoglobin and leukocyte counts were the same as before. Serologic tests for syphilis were negative. An x-ray examination of the chest revealed no abnormality in either the lungs or heart.

On December 17 the patient had a series of convulsions in rapid succession which were followed by a period of unconsciousness lasting for several hours.

Following this a definite change was noted in her condition. Throughout the remainder of her hospital stay, she was conscious for only a few minutes at a time. On January 6 her blood urea nitrogen was 46 mg. per cent and the creatinine was 4 mg. per cent. The uric acid was 9.7 mg. per cent. Examination of the spinal fluid revealed it to be entirely normal. She continued to have an occasional convulsion daily. She was unable to eat and became uncoöperative and incontinent of both urine and feces. Four days before her death, she developed signs of bronchopneumonia. Chemotherapy in the form of sulfathiazole was instituted but she did not respond and died on January 23, 1941.

Anatomical findings (Dr. John Farkas): The body was estimated to weigh about 220 pounds. There was a two plus pitting edema of the left leg up to the groin. There was no jaundice. The pupils were regular and equal. The superficial abdominal fat was 8 cm. in thickness. The peritoneal surfaces were smooth and glistening but several white nodules of tumor tissue were noted under the parietal peritoneum near the midline of the abdominal wall. There were rather firm adhesions about the loops of small bowel in the lower abdomen which firmly attached the bowel to the bladder, rectum, sigmoid colon, and to the large mass of tumor tissue which completely filled the pelvis and the lower portion of the abdomen. The appendix was normal. The liver extended 10 cm. below the right costal margin. The pleural cavities and pericardial sac were negative. Several small, raised nodules about 1 cm. in diameter were found on the fourth and fifth ribs on the left side and in the costal margin in the anterior axillary line.

The heart was of normal weight. There were three pearly white, firm nodules measuring ½ to 1 cm. in diameter within the wall of the right auricle. No other metastases were noted in the heart. The valves, myocardium, and the coronary arteries were otherwise negative. The root of the aorta was normal. The lungs were considerably increased in weight but showed only bronchopneumonia. The spleen was about three times its normal weight but cut sections revealed no abnormalities. The liver was greatly increased in size weighing 3,400 grams. In its right lobe was a large globular mass measuring 15 cm. in diameter. A similar mass was found attached to the upper surface of the left lobe measuring about 9 cm. in diameter. These tumor nodules were soft in consistency, having necrotic centers. Other tumor masses were found within the substance of the liver. The gall bladder was negative and the common bile duct was patent.

The entire pelvis and abdomen were filled with a huge mass of tissue which extended from one iliac fossa to the other. The tumor mass infiltrated the uterus, the bladder, and the rectum. This mass weighed 4,000 grams. The pancreas and adrenal glands were normal. The right ureter was occluded by tumor tissue and the proximal portion of the ureter and the kidney pelvis were dilated. The abdominal aorta was surrounded by tumor tissue as was the vena cava. The mesenteric lymph nodes were greatly enlarged.

Upon opening the skull, several masses of pale, pink tissue measuring 3 to 6 cm. in diameter were found to replace the bone completely over the frontal parietal region. They did not penetrate the dura mater but pressed upon the brain substance. There were no metastases within the brain or any other abnormality.

Anatomic Diagnosis—Generalized lymphosarcoma.

Discussion

Dr. Frank C. Andrus: I was surprised to find that histologically this tumor was a malignant lymphoblastoma of the lymphosarcoma type. There are two concepts of lymphosarcoma; the first, that of a local tumor spreading to the regional lymph nodes and usually arising in the pharynx or small intestine: the second is a generalized form which in its clinical behavior resembles Hodgkin's disease. In fact there are numerous cases which might be regarded as a transition between the two diseases. Fever may occur in lymphosarcoma as in Hodgkin's disease; both cause neurological symptoms by forming epidural infiltrations which press upon the underlying nervous tissue as was the case in this patient. I have seen several patients who were operated upon for a spinal cord tumor and a lymphosarcoma or Hodgkin's tissue were found.

Lymphosarcoma is the most common tumor of the small intestines, where it usually produces the symptoms of intestinal obstruction. Some of these have been cured by excision. This is one of our most radio-sensitive tumors and the mass may entirely disappear after treatment. The second generation of tumor cells, however, are radio-resistant, and the disease is almost uniformly fatal. The edema of the legs in this patient was due to obstruction of the pelvic veins. It seems probable that the elevation in uric acid was due to the increased destruction of nucleoprotein in the leukocytes.

Dr. J. S. McCartney, Jr.: Here we have a tumor which is involving only part of the lymphatic system and a relatively small part of it. The major portion of the tumor is not in the lymphatic structures except for those in the abdomen. However, from the microscopic studies it fits in perfectly with lymphosarcoma. We have seen many examples of lymphosarcoma arising in the intestinal tract, commonly with involvement of the regional lymph nodes.

Dr. George Fahr: Where did the tumor actually start? Do you assume that it started in the pelvis, or don't you know?

Dr. McCartney: We cannot definitely say. At the time we examined the patient we had the rectum, vagina, bladder, retroperitoneal lymph nodes, bones, and other tissues all involved.

Dr. Andrus: We might assume that in this type of lymphosarcoma, the tumor arises as a system disease such as does leukemia in which many tissues appear to undergo the change simultaneously.

Dr. Fahr: Can a lymphosarcoma start in the lymphoid tissue of any organ?

Dr. McCartney: Presumably it can; we most often see it in the lymphoid tissue of the submucosa of the intestine or the stomach. The gastric wall may attain a thickness of 4 to 5 cm.

Dr. Andrus: Quite a few people who have studied this condition feel that occasionally the tumor cells enter the peripheral blood giving rise to a leukemic phase. They feel that, on the basis of the clinical

course and the morphology of the cells under special staining methods, this leukemic picture called "leukosarcoma" should be distinguished from pure lymphatic leukemia.

DR. ALEX BLUMSTEIN: I believe that any patient who presents himself with the symptoms of convulsions should certainly have a film of the skull studied because there is no real way to distinguish between idiopathic epileptiform seizures from symptomatic convulsions. I do not know why I did not suggest an x-ray of the skull in this case. When I saw her I did not even suspect systemic metastases. Another diagnostic possibility, when an adult presents herself with convulsive seizures, is that of hypertensive encephalopathy.

DR. FAHR: If these diastolic blood pressure readings were correct, I do not believe it likely that she had hypertensive encephalopathy, particularly in the absence of choking of the optic discs. However, occasionally with acute hypertension such as may be seen in glomerulonephritis, hypertensive encephalopathy may occur when there is no papilledema. As a rule the blood pressure is very high before symptoms of hypertensive encephalopthy appear.

DR. ANDRUS: Dr. Blumstein, do you often see idiopathic epilepsy making its first appearance in a woman of fifty-nine years of age?

DR BLUMSTEIN: It occurs rarely and even at autopsy one is unable to find any lesion whatsoever. However, it is an excellent general rule to follow that when the seizures come after the age of forty years, some definite organic change is present.

◆ CASE REPORTS ◆

HYPERTENSION ASSOCIATED WITH MITRAL STENOSIS

Report of Forty-Four Cases

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and
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THE study on which this report is based was made to determine the incidence of hypertension in cases of mitral stenosis and the prognosis in cases in which these two conditions are associated.

In order to determine the incidence of hypertension in individuals with mitral stenosis, we studied 1925 consecutive cases of mitral stenosis observed at the Mayo Clinic. Hypertension was present in forty-four of these cases. In order to facilitate the analysis of our findings, these forty-four cases will be designated as group 1. We also made a study of 163 patients with mitral stenosis in which there was no evidence of hypertension. These 163 cases will be designated as group 2.

Incidence.—Hypertension was present in forty-four, or approximately 2.3 per cent, of the entire series of 1925 cases of mitral stenosis. This would indicate that hypertension is not frequently associated with mitral stenosis.

Clinical Data—In group 1, that is, in the forty-four cases in which hypertension was associated with mitral stenosis, eleven of the patients were men and thirty-three were women (table 1). In group 2, that is, in the 163 cases of mitral stenosis in which there was no evidence of hypertension, fifty-six of the patients were men and 107 were women.

The average age of the patients in the cases in group 1 was fifty-one years. The youngest patient in this group was thirty years of age and the oldest patient was sixty-seven years of age. In the cases in group 2 the average age of the patients was thirty-nine years. The oldest patient was sixty-three years and the youngest patient was nineteen years of age respectively.

In the cases in group 1 the average values for the systolic and diastolic blood pressures were 183 mm. and 108 mm. of mercury respectively. The highest values were 250 mm. systolic and 130 mm. diastolic. The lowest values were 152 mm. systolic and 90 mm. diastolic. There was no instance of hypertension group 4, or malignant hypertension, in this group of cases. The hypertension was classified as follows: group 1 or 1+ in thirty-three cases, group 2 in ten cases, and group 3 in one case. In other words, the hypertension was mild in this group of cases.

The values for the systolic and diastolic pressures were normal in all of the cases in group 2.

Auricular fibrillation was present in twenty, or 45 per cent, of the cases in group 1 and in forty-two, or 25 per cent, of the cases in group 2.

Various degrees of congestive heart failure were present in twenty-seven, or 61 per cent, of the cases in group 1. In eight of the twenty-seven cases the heart failure was due chiefly to the hypertension; in nine cases it was thought to be due to both hypertension and mitral stenosis; and in ten cases it was due chiefly to the mitral stenosis.

In the cases in group 1, ten, or 22 per cent, of the patients died. Necropsy was performed in four of the ten cases. The causes of death in the four cases were as follows: heart failure resulting from mitral stenosis in two cases, acute coronary occlusion in one case and cerebral thrombosis in one case. In the cases in group 2, seven, or 4 per cent, of the patients died.

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Comment

The difference in the average age of the patients in the two groups of cases might be a factor in the difference in the clinical data in the two groups. As a general rule, mitral stenosis is liable to be more severe in a group of patients whose average age is thirty-nine years than it is in a group of patients whose average age is fifty-one years. The fact that patients who have mitral stenosis live to become fifty-one years of age is evidence that their mitral stenosis is not severe. In cases in which mitral stenosis is severe, patients as a rule do not live to reach an average age of fifty-one years.

It is significant that the incidence of auricular fibrillation was 45 per cent in group 1 but only 25 per cent in group 2. The incidence of cardiac decompensation was 61 per cent in group 1 but only 18 per cent in group 2. The mortality rate was 22 per cent in group 1 but only 4 per cent in group 2.

We are conscious of the fact that too definite conclusions cannot be drawn from a study of just two groups of cases. Several factors greatly affect the results obtained. The severity of mitral stenosis is so variable that this alone could greatly affect the results. The mortality in our group of cases of mitral stenosis and hypertension was five times as high as it was in cases in which there was no evidence of hypertension. From this study, we conclude that patients who have mitral stenosis are not benefited by the development of hypertension but, on the other hand, are made definitely worse.

TABLE I.—CLINICAL DATA IN CASES IN GROUP 1 AND GROUP 2

Clinical data		Group 1 (forty-four cases in which hypertension was associated with mitral stenosis)	Group 2 (163 cases of mitral stenosis in which there was no evidence of hypertension)
Age, years	Oldest	67	63
	Youngest	30	19
	Average	51	39
Sex	Men	11	56
	Women	33	107
Blood pressure, mm. of mercury	Highest value	250/130	Normal
	Lowest value	152/ 90	
	Average value	183/108	
Auricular fibrillation	Number of cases	20	42
	Percentage of cases	45	25
Congestive heart failure	Number of cases	27	29
	Percentage of cases	61	18
Deaths	Number	10	7
	Per cent	22	4

TUBERCULOSIS AMONG COLLEGE STUDENTS

Ten years ago no more than a dozen school health administrators were actively seeking out tuberculosis among the students in colleges and universities, despite the acknowledged predilection of the tubercle bacillus for those of this age group. Today 248 institutions of higher learning have some form of program for the finding of tuberculosis on the campus. The Tenth Annual Report of the Tuberculosis Committee of the American Student Health Association is both a record of progress and a reminder of what is still to be done.

MISCELLANEOUS

ENCEPHALITIS IN MINNESOTA

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Saint Paul, Minnesota

IN view of the number of cases of encephalitis and the considerable increase in equine encephalomyelitis this year, the following notes relative to our local mosquito potential vectors may be of interest to physicians.

To the present time ten species of mosquitoes have been proved capable of transmitting equine encephalomyelitis under laboratory conditions, although the extent to which the disease is insect borne is yet to be determined. There is no reason to doubt that some of these mosquitoes and probably related species may serve as vectors under natural conditions. It is still true that, contrary to the malaria situation, no infected wild mosquitoes have ever been taken.

The experimentally implicated mosquitoes are the following species:

Ædes ægypti	*Ædes vexans*
Ædes albopictus	*Ædes triseriatus*
Ædes cantator	*Ædes nigromaculis*
Ædes sollicitans	*Ædes dorsalis*
Ædes tæniorhynchus	*Ædes atropalpus*

Of these mosquitoes, the first two are tropical and subtropical species not found in the northern United States. The next three, *canator, sollicitans* and *tæniorhynchus* are salt marsh mosquitoes which do not occur in Minnesota. The remaining five species are present in varying numbers, dependent on seasonal conditions.

Ædes vexans.—The most widely distributed and abundant is *Ædes vexans,* a species which Kelser early found capable of transmitting the virus. We have records of its presence in practically every county in Minnesota in which collecting has been done, though it is relatively uncommon in coniferous forest areas. In favorable seasons, it may appear in great numbers in late May, and in subsequent waves throughout the season. Such seasons we had in 1937 and 1938 when there was widespread complaint regarding mosquito abundance. To a much less extent the present season has been one of unusual abundance of this species.

An index of conditions in 1937 and 1938 is afforded by the relative abundance of *Ædes vexans* in trap catches. In 1937, a single trap at Crystal Bay, Lake Minnetonka, yielded 34,553 mosquitoes of which 30,885, or 89.49 per cent, were this species. In 1938 the total catch in four traps in the Twin Cities area, including Crystal Bay, was 337,960 mosquitoes, of which 332,176, or 98.28 per cent, were of *vexans.* Traps at University Farm, Cedar Lake, Nokomis and at Crystal Bay showed marked similarity in percentages of *vexans,* in spite of dissimilarities in general environment. A hand catch of 4,166 in the summer of 1938 included 2,755, or 66.13 per cent of *vexans.* The low percentage, as contrasted with that from the traps was due to the excessive numbers of *vexans* which led the collectors to neglect collecting them, rather than to these mosquitoes attacking less frequently than did other species. On the other hand, in 1939 it was present throughout the area in such small numbers that there were no complaints of mosquito annoyance. In 1940 it was again of very secondary importance. That year it constituted only 14.6 per cent of a limited hand catch in the Army Maneuvers area.

While *Ædes vexans* attacks most readily in the shade our experience does not support the conclusion of the Massachusetts' workers that it is a woods species and that "perhaps one-half of the exposures to *Ædes vexans* would be eliminated simply by keeping away from the woods."

This species is preëminently a migratory species, as has been demonstrated by several workers who have sprayed enormous numbers of the mosquitoes with anilin dyes and subsequently caught marked specimens as far as fifteen miles distant. One worker reports taking specimens thirty miles from the nearest breeding place, but that record must be accepted with some reservation.

Ædes nigromaculis.—Madson and Knowlton, working in Utah, demonstrated that this species was a potential carrier of the western strain of equine encephalomyelitis, by transmitting the infection to healthy guinea pigs by the bites of *nigromaculis* which had fed on diseased guinea pigs. Attempts to transmit the infection to horses were unsuccessful. The species is relatively rare in Minnesota and most of our records relate to its presence in the prairie sections. However, we have taken it at University Farm, Cedar Lake, Crystal Bay and in the Army Maneuvers area. In 1938 it constituted 0.01 per cent of the total trap catch and was not present in the hand catch of 4,166 total.

Ædes dorsalis.—Madson, Knowlton and Rowe, 1936, reported positive results with six out of 244 attempts with guinea pigs. While this species is usually regarded as a prairie species, it is not uncommon in the Twin Cities area. In 1938 it was represented by 875 specimens, or 0.26 per cent, in the trap catch and 281, or 6.75 per cent, in the hand catch.

Ædes triseriatus.—Dr. W. A. Davis, 1940, working in Massachusetts, was the first to implicate this species. Specimens which had fed on an infected pigeon and others on an infected mouse, transmitted the infection

(Continued on Page 706)

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HOMEOPATHIC AND ECLECTIC MEDICINE IN MINNESOTA*

By James Eckman

Rochester, Minnesota

(Continued from July issue)

Homeopathic Hospitals

One of the outstanding characteristics of supporters of the homeopathic school of medicine in the United States in the Nineteenth Century was their ability to attract prominent figures to the defense of their interests. Packard,[38] for instance, has shown that in New York City William Cullen Bryant (1794-1878) served as president of the board of trustees of the Homœopathic Medical College of the State of New York from 1862 to 1872, and in Minnesota personages no less imposing in local renown supported homeopathy and its institutions for many years. William D. Washburn (1831-1912), president of the Minneapolis and Saint Louis Railway Company and a United States Senator from Minnesota, was elected president of the board of trustees of the Minnesota Homœopathic Medical College at its organization on May 25, 1886,[39] and Senator Washburn and Frederick C. Pillsbury[40] (1852-1892), miller and president of the Minneapolis, Lyndale & Minnetonka Railway Company, in 1886 was elected to the board of directors of the Minneapolis Homœopathic Hospital Association. Thomas Lowry (1843-1909), founder of the Twin City Rapid Transit Company, in 1886 gave $500 in cash toward erection of the annex to the Minneapolis Homœopathic Hospital at Twenty-fifth Street South and Clinton Avenue.[41] Charles M. Loring (1833-1922), for years president of the Minneapolis Board of Park Commissioners and known afar as the "father of the Minneapolis park system," gave $400 in cash to the same project.[41]

In Saint Paul the successes of the homeopaths were even more spectacular. When in the spring of 1887 a proposal was made to erect a homeopathic hospital on Agate Street between Acker and Granite Avenues, former Governor William R. Marshall (1825-1896) was elected to the board of directors of the projected institution; so also was William R. Merriam (1849-1931), governor of Minnesota from 1889 to 1893. Incorporators of the hospital included such men as United States Senator Cushman K. Davis (1838-1900); Alexander Ramsey (1815-1903), former governor of Minnesota, United States Senator and Secretary of War; James J. Hill (1838-1916), creator of the mighty Great Northern railway empire; Edmund Rice (1819-1889), president of the Saint Paul and Pacific Railroad Company and a Congressman; and Charles E. Flandrau (1828-1903), former associate justice of the Supreme Court of the Territory of Minnesota and justly famous in the annals of Minnesota history.[42]

Cottage Hospital.—This early Minneapolis institution was not primarily homeopathic. Hamilton[43] has shown, however, that homeopathic physicians were active in founding Cottage Hospital in 1871, in association with Dr. A. E. Ames (1814-1874) and the Brotherhood of Gethsemane. It was said to be the first private

hospital established in Minneapolis. In 1877 Dr. A. A. Camp (1854-1888) and Dr. W. H. Leonard (1825-1907) were the homeopathic members of the staff of this hospital.

Sister Annette Relf's Homeopathic Hospital.—A woman whom homeopaths called "Sister Annette Relf" started a children's homeopathic hospital in Minneapolis in 1882, and by 1886 she had cared for 160 patients. In 1886 this hospital was situated at 2110 Fifth Avenue South in Minneapolis. It is not clear what its official name was.

Stillwater Homœopathic Hospital.—Description of this pioneer hospital was made by Dr. William H. Caine[44] (1854-1902) of Stillwater in 1882:

> On March 27, 1881, we organized a Homœopathic hospital in Stillwater, and since that date have treated fifteen fractures, had eight amputations, thirty-five cases of lacerated wounds, two dislocations and performed four miscellaneous operations. The hospital has succeeded beyond our expectations; we have been careful to keep our running expenses low, and are to be congratulated because we are out of debt. In fractures of the femur, for dressing, we prefer the double inclined plane, having used it in every case but one, where we applied the counter extension and the sandbags. In fractures of the tibia and fibula we use at first the double inclined plane, and after ten days or so follow it with the plaster-of-paris dressing. In fractured clavicles we use the Sayre dressing, with adhesive straps.

It has been written[45] that this particular homeopathic hospital did not long endure. Dr. Caine, who was house physician and surgeon, in the spring of 1883 was working at the "regular" Stillwater City Hospital, which would suggest that the homeopathic hospital had been closed. Oculist and aurist to the Stillwater Homœopathic Hospital was Dr. Alexander Donald (1846-1921) of Saint Paul. Dr. Henry Hutchinson (1849-1910) of Saint Paul and Dr. Otis M. Humphrey (1832-1911) of Minneapolis were consulting physicians.[45] "This hospital was also supported partly, at least, by benefit parties, records of which appeared in the newspapers of the time."[45]

Dr. Charles N. Dorion (1834-1894) of Saint Paul for a while was consulting surgeon to this hospital, and is worthy of mention herein. He came to Saint Paul in 1878. In 1873 and 1874 he had been professor of anatomy in the Hahnemann Medical College and Hospital of Chicago; in 1874 he had been appointed adjunct professor of obstetrics in the Chicago school.[32] He had also, with Dr. A. Claude of Paris, translated *Lectures, Clinical and Didactic, on the Diseases of Women,* into French.[32] The work had been written by Dr. Reuben Ludlam (1831-1899), a professor in the aforementioned college, and co-editor of the old *United States Medical and Surgical Journal,* a homeopathic organ.

Minneapolis Homœopathic Hospital.—In about 1882 a group of Minneapolis women interested in homeopathy founded the "Hahnemann Ward Association" and installed a "Hahnemann Ward" in a rented building at Ninth Street and Eighth Avenue South.[35] Homeopathic practitioners and their supporters then bought for $5,000 a lot on Eighth Street, and sold it to the City of Minneapolis for $10,000. The next step was purchase of a building at Fourth Avenue South and Twenty-fifth Street. Homeopaths paid $25,000 for this structure, utilizing the $10,000 they had received from the city, and assuming a mortgage of $15,000 for the remainder of the purchase price.[35] Possession of this building was taken in February, 1884. It was this hospital which was utilized for students of homeopathic medicine when in 1886 the Minnesota Homœopathic Medical College was founded. In 1886 an annex to the hospital was erected.[41]

Status of the Minneapolis Homœopathic Hospital in 1887 was evaluated by the

Saturday Spectator for December of that year, as reprinted by the *Minnesota Medical Monthly*:[46]

Minneapolis Homœopathic Hospital

We clip the following from the Superintendent's report in the Christmas edition of the *Saturday Spectator:*

"The organization of this institution was an absolute necessity, owing to the fact that the city was distributing its sick among the various hospitals, and to a great many of the patients then, as now, 'old school' treatment was positively an affliction. That those preferring homœopathic treatment might have it, the hospital was opened in November, 1882.

"At present about forty patients can be accommodated, at prices ranging from $6 to $15 per week. While a private patient may choose a physician of any school to treat him, all charity and hospital patients are under the care of the hospital staff, composed of nine competent homœopathic physicians. As a proof of their efficiency, as well as that of the hospital management, out of fifty-three cases of typhoid fever cared for during the past summer and fall, but *four cases,* or less than 8 per cent, resulted fatally. A special ward is set aside for the care of lying-in patients, and to unfortunate girls, or those without means, a helping hand is extended. Another special feature is a ward, and the only one in the city, for the reception of contagious diseases; here as in the other wards, a patient may choose his own physician or employ a member of the hospital staff."

Maternity Hospital.—It was written that Maternity Hospital was opened in Minneapolis on November 30, 1886, at 609 Eight-and-a-Half Street.[47] It had a staff of three women homeopathic physicians, and a consulting staff consisting of Dr. Philo L. Hatch (1823-1904), Dr. William H. Leonard (1825-1907) and Dr. Adele S. Hutchinson (1847-1909). It was proclaimed as "the only one of its kind in the city or state" in 1887,[47] and functioned as a lying-in hospital for married women and for unfortunate, but not depraved, unmarried girls. This institution is still in existence (1940) and is situated at 2215 Glenwood Avenue in Minneapolis. It has thirty-six beds and thirty-six bassinets, and is nonprofit-making. Attached to it is the Ripley Memorial Hospital, named for Dr. Martha G. Ripley (1843-1912), one of the homeopathic women physicians of the first staff of the hospital.

Saint Paul Homœopathic Hospital.—Little is known about this hospital. Armstrong[48] has demonstrated that in 1887 it was opened at 800 Agate Street in Saint Paul but it did not endure long. Plans were made in the spring of 1887 for the erection of a homeopathic hospital on Agate Street between Acker and Granite Avenues in Saint Paul,[42] and it is no doubt this institution to which Armstrong[48] referred. On February 1, 1888, at Armory Hall, in Saint Paul, a "grand charity ball" was held for the benefit of the Saint Paul Homœopathic Hospital, but the situation of the hospital itself was not mentioned in the announcement of the ball.[49]

Minneapolis Free Homœopathic Dispensary.—Aldrich[36] said that this unit was established at the old Cottage Hospital in Minneapolis by William H. Leonard. It was supposed to have been transferred to the Minnesota Homœopathic Medical College when that institution was founded in 1886. When the University of Minnesota College of Homœopathic Medicine and Surgery was organized, the free dispensary was moved to the grounds of Saint Barnabas Hospital in Minneapolis. Aldrich[36] wrote that it was finally reorganized as the University Homœopathic Free Dispensary.

Saint Paul Homœopathic Free Dispensary.—This dispensary was opened on July 18, 1887, at 181½ East Seventh Street in Saint Paul. It is not known how long it existed.

Pharmacies.—For drugs and materia medica, Minneapolis homeopaths repaired to the pharmacy of Thomas Gardiner at 306 Nicollet Avenue. This pharmacy was founded in 1869; prior to that year Gardiner had been a member of the firm of William H. Leonard & Company, Drugs. Later, the Philadelphia firm of Boericke and Tafel had a pharmaceutical house in Minneapolis; it was succeeded by the Minneapolis Pharmacy Company, which published the *Minneapolis Homœopathic Magazine.* The Saint Paul Homœopathic Pharmacy was situated at 109 East Seventh Street, not far from the Saint Paul Homœopathic Free Dispensary. A pharmaceutical house much favored by Minnesota homeopaths in general was the Duncan Brothers' Homœopathic Pharmacy at 56 State Street in Chicago.

The Minnesota Homœopathic Medical College

The Minnesota Homœopathic Medical College had its genesis in a resolution passed at the old Nicollet House in Minneapolis on February 23, 1886, at a mass meeting of homeopathic physicians:

> RESOLVED, That a committee be appointed to prepare the Articles of Incorporation of a Homœopathic College of Medicine, select the incorporators, secure their signatures, proceed with all necessary work for the establishment of the journal, and do such other work as would naturally devolve upon the board of trustees, until such board shall be legally formed, when such board shall legally become the successors of the committee.[50]

Members of the committee were the dentist, Dr. A. L. Bausman (1834-1911), chairman, Dr. Otis Milton Humphrey (1832-1911), Dr. John F. Fargo (1835-1911), Dr. William E. Leonard, and Dr. P. M. Hall (1860-1928). Trustees were elected on May 14, and these trustees organized themselves on May 25, 1886, in the Syndicate Block in Minneapolis. The college itself opened on October 4, 1886, at 9 o'clock in the morning, in a building at Fourth Avenue and Twentieth Street in Minneapolis, with Dr. Philo L. Hatch (1823-1904) as dean.[51]

The history of this institution was written by Dr. Eugene L. Mann (1861-1925) who was dean and professor of diseases of the nose and throat in the homeopathic college at the University of Minnesota, and a trustee of the American Institute of Homœopathy. Mann[52] wrote that the college demanded a minimum of two years' study for graduation of a candidate as a Doctor of Medicine, but that three years of study were "earnestly recommended by the faculty."

This college utilized, as might be expected, the resources of the Minneapolis Homœopathic Hospital, and it seems to have been successful, also, in securing access to other Minneapolis hospitals for its students. On April 4, 1887, the college graduated its first class of two homeopathic physicians. In 1887 Dean Hatch removed to California, and Dr. David M. Goodwin (1833-1908), who had been professor of the principles and practice of surgery, was elected Hatch's successor, with the rank of professor of obstetrics. On April 2, 1888, the second class was graduated. It consisted of four candidates. Meanwhile, however, the Board of Regents of the University of Minnesota had decided to establish a medical college* at the university, and since homeopathy was then in a position of

*A medical department had been established at the University of Minnesota in 1883, largely because of the efforts of Dr. Charles N. Hewitt (1836-1910), secretary of the Minnesota State Board of Health and Vital Statistics. No courses were offered. The chief function of the faculty was to examine candidates for the degrees of Bachelor of Medicine and Doctor of Medicine, and for licensure to practice medicine in Minnesota.

comparative power within the state, the Regents had determined to include homeopathic instruction in this medical department. Two chairs were proposed: that of materia medica and that of therapeutics, but the homeopaths were too powerful to be satisfied with these. They demanded and obtained a separate college, unassociated with the "regular" College of Medicine and Surgery of the University of Minnesota. It was known as the University of Minnesota College of Homœopathic Medicine and Surgery. The faculty consisted of these physicians:

Henry W. Brazie (1843-1927)—Secretary, Professor of Pædology
Albert E. Higbee (1842-1924)—Professor of Gynæcology
John F. Beaumont (1855-1927)—Professor of Ophthalmology
H. C. Leonard (1849-1925)—Professor of Obstetrics
George E. Ricker (1854-1905)—Professor of Clinical Medicine
William E. Leonard (1855-1935)—Professor of Materia Medica
Robert D. Matchan (1854-1935)—Professor of Surgery
Warren S. Briggs (1854-1914)—Professor of Clinical Surgery
Salathiel M. Spaulding (1839-1906)—Professor of Nervous Diseases
Henry Hutchinson (1849-1910)—Professor of Practice
Benjamin H. Ogden (1860-1924)—Professor of Diseases of the Skin and Genito-urinary Diseases
Eugene L. Mann (1861-1925)—Professor of Diseases of the Nose and Throat
David A. Strickler (1859-†)—Professor of Otology

At first this college was supervised by the dean of the department of medicine of the University of Minnesota, assisted by the secretary and one faculty member, respectively, from each of the College of Medicine and Surgery, College of Homœopathic Medicine and Surgery, and the College of Dentistry. Later, however, the dean of the department of medicine became dean of the College of Medicine and Surgery, and the secretary of the College of Dentistry and the secretary of the College of Homœopathic Medicine and Surgery became deans of those two colleges. Dr. H. W. Brazie (1843-1927) served as dean of the homeopathic school until 1893, in which year Dr. Alonzo Potter Williamson (1854-1920) became dean. In September, 1902, the college moved to a building on the campus, vacating the building situated at Ninth Avenue South and Sixth Street in Minneapolis which the Board of Regents had rented for it. In 1903 Dr. Williamson resigned as dean to become superintendent of the Southern California Hospital for the Insane, and Dr. Mann became his successor.

The beginning of the end of this college, according to Dr. Mann,[52] occurred in 1903 in an action of the Board of Regents which decreed that prospective entrants of the college must have completed one year of academic college work. In 1906 the Regents further decreed that such an entrant must have completed two years of academic college work before entering the college. This was a disastrous blow, for homeopaths had long insisted that a high school education was sufficient background for any student who wished to enter a homeopathic medical college.* The University of Iowa College of Homeopathic Medicine and the homeopathic schools at Chicago, for instance, had no such requirements as those which the Regents formulated Hence, men who wished to become homeopaths naturally entered the colleges in those two cities, and shunned the

†Dr. Strickler is still living in Denver, Colorado, and has served as secretary of the Colorado State Board of Medical Examiners.

*The University of Minnesota College of Medicine and Surgery in 1888 would admit candidates who had only a high school education; if a candidate did not have such an education he could still gain entry by taking and passing "a very simple entrance examination."

college at the University of Minnesota. "The fall of 1908," Mann[52] declared, "found the college in this unenviable position with a very diminutive student body and no hope of obtaining any favors from the board of regents." With signal energy, the homeopaths invaded in the State Capitol at Saint Paul in January, 1909, and actually obtained from the Legislature an appropriation of $50,000 with which to erect a building on the university campus for the College of Homœopathic Medicine and Surgery. In May, 1909, however, the Board of Regents abolished the college, substituting for it a chair of homeopathic materia medica and a chair of homeopathic therapeutics in the medical department of the university.

As Beard[53] wrote:

> The Board of Regents concluded, in the year 1909, as they might have known long before, that fundamentally there was only one science of medicine; but in order to prove it to the satisfaction of the public, they created two Chairs, the one of homeopathic materia medica, or the study of drugs under different names, and the other of homeopathic therapeutics, or the study of drugs under different doses. The professors in the two Chairs were paid $2,000 each for one year. They earned it. Day by day, throughout that year, they came and sat in those Chairs for the assigned hour, in which no student ever appeared! At the end of the year the Board decided that the Chairs in which homeopathy had sat might as well go, as the College had gone, into the place of Shades.

In 1911 Dr. Henry R. Diessner (1853-1935) of Waconia, a graduate of the Hahnemann Medical College and Hospital of Chicago in 1883, attempted in House File No. 315, "A Bill for an Act to Amend Section 1479 of the Revised Laws of Minnesota 1905, Relating to the Organization of the University of Minnesota and Creating a College or Department of Homeopathic Medicine and Surgery," to revive in some measure the homeopathic tradition at the University, but even though Dr. Diessner was a member of the Legislature, he could not get his bill to pass.[54] The Minnesota Homœopathic Medical College and the University of Minnesota College of Homœopathic Medicine and Surgery were dead and beyond recall.

In 1915 Dr. Beard[55] was able to write:

> There is further evidence of qualitative improvement in the rapid disappearance of sectarian schools. The nondescript pattern has entirely gone. So has the physio-medical type. The eclectics have dropped from ten to four colleges. The homeopaths have but eight schools left out of a maximal twenty-two.
>
> One of the curious things about the present teaching of homeopathy is that sixty-two per cent of its students are taught in New York, Massachusetts and Pennsylvania; thirty-four per cent in three states of the middle west and four per cent in California.

Homeopathic Literature

Minnesota Homœopath.—Armstrong[56] has shown that the *Minnesota Homœopath* was published bi-monthly in Saint Paul by one Dr. George Hadfield in either 1858 or 1859.* The single issue of this journal known to exist is imprinted with the date of January, 1859, and is number 4 of volume 1. This would imply that number 1 of volume 1 had been issued in July of 1858, although it is probably bootless to speculate as to the date of issuance of the first copy of such an ephemeral publication. Armstrong has obtained a picture of Dr. Hadfield, and has set down what is known of his life and career.[56] It would appear that the *Minnesota Homœopath* had a most fleeting existence. Armstrong[56] said that it contained "articles on homeopathy, testi-

*The author wishes to correct an egregious error which he made in an earlier consideration of the *Minnesota Homœopath* (Journal-Lancet, 60:60-67, Feb., 1940). The date of beginning of the *Minnesota Homœopath* should have been 1858 or 1859; in the paper referred to it was wrongly set down as 1854.

monials, and advertisements of Dr. Hadfield's medicines." The little pamphlet is probably Minnesota's first medical journal of any nature.

Transactions of the Minnesota State Homœopathic Institute.—The first bound volume of the *Transactions* was published in Minneapolis in 1882, and had been prepared by a committee consisting of three homeopaths, the chairman of the committee probably being Dr. William E. Leonard (1855-1935). It was printed by A. C. Bausman of Minneapolis, and contained proceedings of the annual sessions of the state body from 1867 to (but not including) 1882, as well as other material. The second volume embraced the years 1882 through 1884; it bore no date or place of issuance, and consisted of bound reprints from the *Medical Counselor* of Chicago. The third volume contained papers and proceedings of meetings of the state society for the years 1885 and 1886, and was styled as a reprint from the *Minnesota Medical Monthly* for April, 1887. The fourth volume was composed of material written and collected in the years 1887, 1888 and 1889. It bore the imprint, "Satterlee, Publisher, Minneapolis, Minn., April, 1891."

Minnesota Medical Monthly.—This homeopathic journal was planned at a mass meeting of homeopaths at the old Nicollet House on February 23, 1886, at which a committee was selected to draw up articles of incorporation for both a homeopathic medical college and a medical journal.[50] Dr. William E. Leonard (1855-1935) was a member of this committee, and the chairman was Dr. A. L. Bausman (1834-1911), a dentist. Other members were Dr. Otis M. Humphrey (1832-1911), Dr. John F. Fargo (1835-1911) and Dr. Pearl M. Hall (1860-1928). Dr. Leonard was appointed to be editor-in-chief of the *Minnesota Medical Monthly*, and his associate editors were Dr. Hall, Dr. Robert D. Matchan (1854-1935) and Dr. Salathiel M. Spaulding (1839-1906). First copy of the new journal bore the date, May, 1886. In this journal Dr. Leonard castigated the "regular" school with robust vigor. In his editorial pages he reprinted paragraphs from other homeopathic journals which heaped scorn on the work of Louis Pasteur (1822-1895), denied the validity of the theory of the bacterial origin of infection, and roundly scolded allopathic attempts at the relief of certain conditions, such as hemorrhoids and malposition of the uterus, by surgical procedures. Last issue of the journal was the one for April of 1888. The *Minnesota Medical Monthly* cost $1.00 a year, or fifteen cents a copy, and was issued by the Homœopathic Publishing Company in the Syndicate Block in Minneapolis.

The Medical Argus.—This journal was established in Kansas City, Missouri, by Frank Fisk Casseday, Ph.B., M.D. (1856-1932). The first issue was the one for July of 1890, and in that issue Dr. Casseday[57] wrote: "During the past few years several attempts have been made to establish a medical journal devoted to homœopathy, in Western Missouri or in eastern Kansas. For one reason or another these efforts have been hitherto unsuccessful.....The ARGUS will be published in the best interests of homœopathy, and our platform will be broad enough so that every department of work in which homœopathic physicians are engaged will receive that attention which it merits." In October of 1890 Dr. Casseday[58] reiterated his intentions: "The ARGUS is for Homœopathy, first, last and all the time, and we believe that we voice the sentiments of the vast majority of homœopathic physicians in the United States when we call for more energetic work in spreading the gospel of Homœopathy among the people." The

journal was moved to Minneapolis in 1891, and the first issue printed in Minneapolis was dated February, 1891. The last issue of the *Medical Argus* was dated January, 1898.

The Minneapolis Homœopathic Magazine.—This journal was subsidized by the Minneapolis Pharmacy Company, 608 Nicollet Avenue, Minneapolis. It was a monthly publication, and sold for $1.00 a year. It was edited by Dr. Henry C. Aldrich (1857-1922), and the associate editors were Dr. John F. Beaumont (1854-1927), Dr. David W. Horning (1852-1917) and Dr. Asa S. Wilcox (1859-1916). First issue of the journal was said by Aldrich[36] to be that for January, 1892. In all, eleven volumes were published. The *Minneapolis Homœopathic Magazine* ceased publication in 1902.

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*References 1-18 appear in the June issue, page 479; 19-37 in the July issue, page 572.

(To be continued in the September issue)

President's Letter

"WHY MEDICAL SOCIETIES?"

THE membership will have an opportunity to attend many local, state and national medical gatherings during the next few months. All meetings to gain our attention must assure three fundamental interests to the attender. First, there must be the scientific program; second, the economic side and discussions; and third, the social contacts. A real meeting to be enjoyed will combine all three in a just proportion.

The scientific portion, to be successful, must be one in which up-to-date scientific endeavor and research are expounded in a language understandable to all, with the knowledge which can be obtained from textbooks eliminated to a great extent, known statistics cut to a minimum, and papers shortened to the time allotted.

The economic side of the practice of medicine should have a very substantial part of the time. Economics and their study in this changing world of medical practice is most necessary if we are going to keep the many types of so-called "state medicine" from fastening their claws in the endeavor now rampant to destroy medical ethics such as we know them. Men with experience and economically minded can well be used on this part of the program. Theory should be eliminated; hard, cold facts discussed.

Social contacts are most necessary and the man or woman who does not come away from a meeting having gained one or more friends has lost a golden opportunity not only to increase his acquaintance but to cement the medical world closer within itself.

The Northern Minnesota Medical Association to be held at Saint Cloud August 15-16 and the Southern Minnesota Medical Association to be held in Mankato September 29 are meetings where home folks meet and get acquainted with each other. They well supplement the meeting of our state association and because of being held in the smaller cities of our state create a greater interest in medicine in the various localities of the state where assembled.

Everyone who can should attend. They will find not only a strong scientific and economic program but an unparalled opportunity for social contacts which we all need to cultivate.

B. J. BRANTON, M.D., *President*
Minnesota State Medical Association.

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE

Volume 24 AUGUST, 1941 Number 8

INTERN HEALTH

MUCH of the report of the Council on Medical Education and Hospitals at the recent meeting of the A.M.A. dwelt on the subject of Intern Health. The findings and recommendations of the Council deserve emphasis.

In its survey the Council found that among sixty-one interns who during the period 1937, 1938 and 1939 were compelled to discontinue work because of illness, tuberculosis was the cause in thirty-six (59 per cent).

In 1940 the Council sent questionnaires to more than 5,000 medical graduates of 1937 regarding health during internship. Over half the questionnaires were filled out and returned. From the replies and the records in the A.M.A. files of thirty-four fatalities known to have occurred among the 1937 graduates, it was determined that three diseases were rather outstanding among the great variety of severe and minor illnesses experienced. There had been 142 cases of appendicitis; 103 cases of pneumonia; and forty-eight cases of tuberculosis.

Appendicitis is not preventable but presumably it is promptly recognized and properly treated when it appears among interns. The incidence of pneumonia, which may or may not follow an acute respiratory infection, seems high. The question arises whether acute respiratory infections receive due consideration in the intern population and whether hospitals in general provide the proper mechanism for care of the common cold. The early detection of tuberculosis is essential among interns as well as elsewhere. The recommendation of the Council that chest radiographs of all interns be taken at intervals of three to six months is worthy of adoption. Even more important is the desirability of furnishing healthful recreational facilities for interns in order to prevent the development of this serious infection.

By the time the medical student has reached his internship year he has had several years of close application to his studies. All have not been able to spend summer vacations in the great outdoors, and they should receive more than the casual medical supervision given them in many hospitals.

SMALLPOX AND MINNESOTA

THE distinction that Minnesota had in 1940 of having had more cases of smallpox than any other state in the Union is not enviable. Even the fact that Iowa was a close second with 412 cases compared to Minnesota's 416 does not help.

Smallpox is a preventable disease. While it is not as malignant as it was formerly and can be mild, it can be loathsome.

From 1900 to 1919 there were more than three-quarters of a million cases of smallpox in the

country, with 11,435 deaths. In the next two decades there were nearly 700,000 cases with 5,337 deaths. Seventy-five per cent of those 700,000 cases and 90 per cent of the 5,337 deaths occurred in the decade from 1920 through 1929. During the last decade the incidence and virulence of the disease have been decidedly less. As a matter of fact, last year only 2,839 cases were reported, which is about half those reported in 1934, the previous low record. Nevertheless, several thousand cases of a preventable disease yearly merit some consideration.

Citizens of Minnesota probably do not know that smallpox is practically nonexistent in certain sections of our country. Not a single case was reported last year in the New England and Middle Atlantic states. The West North Central states, which include Minnesota, experienced many more cases than any other group of states.

The reason for the situation lies in the laws adopted by the various states in respect to vaccination. An analysis of the state laws seems to indicate that those states which require vaccination of pupils before they enter school are practically free from smallpox. After such a law has been in effect a few years smallpox ceases to exist. In New York this law applies only to cities of over 50,000 population and yet has apparently resulted in freeing this state of the disease.

In Minnesota the law reads that a child cannot be excluded from a public school because unvaccinated except during a smallpox epidemic. The wording of the law suggests that the legislators considered the right to go to school all important. And yet the law gives the school board the right to exclude an unvaccinated child during an epidemic. From the standpoint of abstract justice, if the legislature can justly exclude an unvaccinated child during an epidemic, why can it not rightly exclude unvaccinated children in order to prevent epidemics?

The prevalence of smallpox is an indication of a state's public health intelligence. Minnesota has been among the leaders in many phases of public health, notably in anti-tuberculosis work and in reducing maternal and infant mortality. There is good reason to believe that a change in our vaccination laws, requiring vaccination before admission to schools, would result, within a few years, in eliminating smallpox from Minnesota just as it has done in the East.

In Memoriam

Kenneth V. Overend

Dr. K. V. Overend, of Hallock, Minnesota, died June 21, 1941, at the age of fifty-four, following a long illness.

Dr. Overend was born August 18, 1886, at Orilla, Ontario. He received his medical degree from Queen's College, Kingston, Ontario. He began practice at Draysota. About 1911 he moved to Hallock where after ton, North Dakota, and later moved to Kennedy, Minnesota. About 1911 be moved to Hallock, where after some years he formed a partnership with Dr. Fred Meyers.

In 1914 Dr. Overend married Grace Mae Fowler of Pembina, North Dakota. He is survived by his wife and four children.

J. A. Slocumb

Dr. J. A. Slocumb, Plainview, Minnesota, died July 3, 1941, following an illness of several years.

Dr. Slocumb was born at Reads, Minnesota, December 19, 1873. A year later the family moved to Winona where he lived until he took up the practice of medicine. The son of a river boat captain, he spent much of his vacations on the river boats.

After graduating from the Winona h'gh school in 1892, Dr. Slocumb studied medicine at the College of Physicians and Surgeons in Chicago, where he received his degree in 1895. After practicing six months at Minneiska, he took over the practice of Dr. Muir at Plainview where he had since practiced.

Much of Dr. Slocumb's practice was in the horse and buggy days before the advent of the automobile and good roads. He served as president of the Wabasha County Medical Society in 1900, 1906 and again in 1919.

As a boy he became an expert cornetist and for many years was an active member of Plainview's band. He served many years on the health board and several terms on the school board. He was one of the promoters of Plainview's first electric light plant, worked to promote the county fair and was always an active participant in the Commercial Club and in other local civic and church affairs.

Dr. Slocumb married Zula Burchard, May 11, 1898. She and two sons, Jesse B. Slocumb, Saint Paul, and Dr. Charles H. Slocumb, Rochester, and one daughter, Mrs. Spencer L. Parker, Minneapolis, survive.

Better dietary habits especially during the past twenty years, have enhanced inborn resistance to all diseases including tuberculosis.—Fred H. Heise, M.D., Amer. Rev. of Tuber., Feb., 1941.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

DOCTOR SHORTAGE

Minnesota had none too many physicians before the national defense effort began.

Now it is clear that there is a definite shortage in medical service. The gaps that have resulted from the departure for active military duty of some 200 reserve and national guard officers have been particularly difficult to bridge in rural districts.

Efforts to find substitutes who could go in to these districts "for the duration" have not often met with success and the result has been, in many instances, that colleagues from neighboring towns have been obliged to take over the medical service for an entire community from more than a commuting distance.

It may be confidently expected that these gaps will become more numerous and the consequent need for adjustments and sacrifices on the part of medical men who remain on the home front will be even greater.

What's at Stake

Civic duty and humanitarian considerations will dictate the extent and character of these adjustments. But all physicians should realize that there is more at stake in this situation than the provision of adequate medical care to the civilian population.

When a rural community is stripped of physicians it means that the nearest doctor may be as much as 20 miles or more away. Good roads and good cars are able to bridge the distance; but the cost of mileage runs up.

The result is that an ordinary home call may cost as much as $10 and more.

For Government Aid

And the result of that is dissatisfaction, resentment and a demand for government relief. The resentment, in all probability, will be directed toward the hard-pressed physician who felt obliged to add necessary mileage costs to his fee. The demand will be for government aid, in the shape of subsidized medical service, for the period of the emergency, an understandable and even logical demand under the circumstances. The trouble is that subsidized service of that kind will have a strong tendency to hold over after the emergency is over and the original practitioners are released from military service.

The situation presents serious difficulties because, after all, transportation costs money and the physician, with every will in the world, cannot be expected to assume the whole burden of it.

Solution

The solution must be found, however, and before—not after—the chorus of complaint arises.

In this, as in many other situations, medical men may well pool their efforts and work together as they have learned to work together in their relations with welfare and relief departments, to provide the essential care.

Physicians Could Get Together

A coöperative plan by which all near-by reputable physicians voluntarily get together to make their services available in rotation in the doctorless community will solve the problem with good will on all sides. The principle of free choice will not be endangered because the entire project will be clearly a temporary accommodation to meet the emergency.

Thus, one of four available physicians might arrange to be present and on call in the community in rotation, each day in the week. He could make all necessary home calls and answer all emergencies. Long and expensive trips for each individual call would then be eliminated.

Would Be Well Received

The plan would be a temporary stop-gap, of course, and recognized as such on all hands. But the good will shown by the physicians in such a

coöperative effort to brige the gap would undoubtedly be thankfully received. Instead of bitter criticism for physicians who found it necessary to charge high mileage costs, there would be good will and gratitude for an arrangement which few, indeed, would resent and nearly all would be glad to accept as part and parcel of the general sacrifice required by national defense.

No Demands

There are a number of communities in Minnesota, now, where coöperative efforts of this sort should, and no doubt will be, considered.

For the doctors who remain at home—and for organized medicine in general, too—it is not enough to plead that they too, are victims of the emergency, and so seek to shift responsibility.

American medicine has been challenged and American physicians are under fire. In spite of current pre-occupations, some government agencies still cast covetous eyes upon services to the sick and there is no doubt whatever that community demands for aid and relief of this character will meet with alert response.

The point is that there must be no demands.

"... THAT THE PEOPLE MAY FIND THE WAY"

George Crownhart, late secretary of the Wisconsin State Medical Society, gave an address before the Health and Accident Underwriters on June 3 in Chicago, three days before his death in Cleveland.

The subject was "Sickness Insurance Abroad." It was much the same address that Mr. Crownhart gave two years ago at a Minnesota County Officers' Conference. But it was given with a challenging awareness of the changes that have taken place in the interval, changes which have brought compulsory sickness insurance closer, not farther away from American life today.

Mr. Crownhart was a careful student and a highly intelligent observer of trends at home as well as abroad. The concluding plea from his last address is interesting and is quoted below especially because of the suggestion that the social ills he had observed in European systems of sickness insurance were comparable in gravity and in their fatal nature to heart disease and cancer.

"I would leave you," said Mr. Crownhart, "with the thought, not that we cannot have compulsory sickness insurance here; or that its closely knit proponents are not making headway to that end. I would leave you with my conviction that such systems have their own diseases that are of such consequence that they can be classed in the same breath with heart disease and cancer; that these, rather than money contributions, constitute the real purchase price for this so-called social legislation.

"In the face of active proposals for the enactment of this legislation in our own country, it is not your duty as well as mine to 'give light that the people may find the way'?"

NEW YORK'S MEDICAL AND WARD CARE SERVICE

A cautious new experiment in a combination of hospital and medical care insurance has been launched in New York City by Associated Hospital Service and a newly organized nonprofit, medical insurance corporation known as Community Medical Care, Inc.

Ward care only, with all necessary medical service in the hospital, will be given under this new plan. Subscribers will be limited to single persons earning $1,200 a year or less, married persons with joint incomes of $1,680 or less for maternal privileges and families with children having incomes of $2,100 or less. Payments will be made by the payroll deduction method and will amount to $12 per year for single individuals and $27 a year for families regardless of the number of children, up to eighteen years of age.

These rates mean that the hospitals are offering the hospitalization part of the contract at a rate well under the 3-cents-a-day rate for two or three bed room service offered regularly by Associated Hospital Service.

Under the new low-cost plan hospital service and medical care will not be offered separately but only under the combined contract.

Patients will have free choice of all participating hospitals and of physicians so long as their physicians are members of the courtesy staffs of the hospitals.

Under the usual order of things medical care for ward patients is given free by house physicians and members of the hospital staff. Receipts for medical services to ward patients earned under this plan will be pooled and divided among all who give the service.

Administrative expenses will be shared equally by the two organizations.

Community Medical Care, Inc., is directed by Dr. I. Ogden Woodruff of New York and six former presidents of county medical societies of Greater New York are said to be on its board of directors. The whole plan has been developed after long study of a variety of proposals by Dr. S. S. Goldwater, president of the hospital organization.

HOSPITAL STRIKES

Two strikes in large eastern hospitals and unrest in many other parts of the country have shown, according to a recent issue of *Hospital Management*, that some effort will have to be made to find a solution other than strikes and violence to difficulties, whether spontaneous or incited, among hospital employes.

At West Pennsylvania Hospital in Pittsburgh, a large voluntary hospital which does a substantial amount of charity work, a strike began last April. It was engineered by CIO Hospital Workers Local No. 255 of the State County and Municipal Workers of America and it was marked by picketing assaults on loyal workers and visitors and other manifestations depressingly familiar in industry. The hospital obtained a restraining order forbidding the Labor Relations Board and the union from attempting any application of the state's labor laws to hospitals. The order was sustained on appeal to the Supreme Court. But the strike is still going on.

In the case of the other strike at the Adelphi, a private proprietary hospital in Brooklyn, the New York State Labor Board held that this hospital was subject to the law requiring employers to recognize and bargain with unions representing their employes. The first court to which the matter was appealed sustained the Board.

It is interesting to note that the leader in the West Pennsylvania strike, John W. Filer by name, was revealed by Columnist Westbrook Pegler to be a criminal of long and varied experience, a convicted robber, deserter from the U. S. Army, automobile thief and highway robber. In 1931 he was convicted of highway robbery and served four years of a five to ten-year sentence in the penitentiary. He was still on parole when, as attendant employed in the city home for the mentally ill, he became president of the CIO local.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

J. F. Du Bois, M.D., Secretary

Fairmont Physician's License Suspended for Three Years

Re: Revocation of the license of Harry A. Miller, M.D.

On July 11, 1941, the Minnesota State Board of Medical Examiners suspended, for a period of three years, the license to practice medicine held by Harry A. Miller, M.D., of Fairmont, Minnesota. The suspension of Dr. Miller's license is the culmination of an investigation conducted by the Board to determine the circumstances surrounding the rendering of professional services by Dr. Miller to a twenty-four-year-old unmarried patient. The investigation disclosed that the girl went to Dr. Miller for the purpose of terminating her pregnancy and that Dr. Miller packed the uterus and was paid the sum of $50.00 for his services. Several days later a miscarriage took place. The Board could find no justification for Dr. Miller's action.

Dr. Miller was born at LeMars, Iowa, in 1885, and graduated from the Medical School of the University of Minnesota in 1919. He was admitted to practice in Minnesota in 1919 by examination and has practiced at Fairmont since 1928.

Ex-Convict Sentenced to One Year in Minneapolis Workhouse for Violation of Basic Science Law

Re: State of Minnesota vs. Frank J. Brady, alias Frank Bateman.

On July 7, 1941, Frank J. Brady, alias Frank Bateman, fifty-six years of age, who resided at 1400 Yale Place, Minneapolis, entered a plea of guilty in the District Court of Hennepin County to an information charging him with the crime of practicing healing without a basic science certificate, and was sentenced by the Hon. Frank E. Reed, Judge of the District Court, to a term of one year in the Minneapolis Workhouse. Brady was arrested on July 4, 1941, in his apartment while the Minneapolis police were searching for an escaped convict, who was thought to be hiding out at Brady's place. The party for whom the police were searching was not found, but the police discovered a physician's examining table, an electric sterilizer, numerous catheters and medicinal preparations in Brady's apartment. Following a joint investigation of the matter by the Minnesota State Board of Medical Examiners and the Minneapolis Police Department, a complaint was filed against Brady by Mr. Brist on behalf of the Medical Board charging Brady with practicing healing without a basic science certificate.

Brady has two previous convictions for felonies, the first one being for grand larceny in the second degree. Brady, under the name of Frank Bateman, entered a plea of guilty in the District Court of Ramsey County, Minnesota, on October 3, 1922, to an information charging him with the crime of grand larceny in the second degree. That charge grew out of the theft by Brady of a $600.00 Buick touring car. Brady told the Court in 1922 that he was born in Fulton County, Kentucky, in 1885, and that he had been a salesman and also had been in the hotel business. Brady served thirty-one months in the State Prison at Stillwater on that charge. On October 7, 1931, Brady, under the name of Frank Bateman, pleaded guilty in the District Court of Hennepin County, to a charge of manslaughter in the first degree, and was sentenced to ten years in the State Prison at Stillwater. That charge grew out of a criminal abortion performed by Brady on a Minneapolis girl who died on June 5, of that year, Brady's former wife, Isabelle Bateman, also served a term in the Woman's Reformatory at Shakopee, for criminal abortion, having been sentenced on October 30, 1935, to a term of not to exceed four years.

INDUSTRIAL HEALTH

Edited by the Committee on Industrial Health and Occupational Diseases

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T. A. Lowe, South Saint Paul
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O. H. Wangensteen, Minneapolis
A. E. Wilcox, Minneapolis

NEW DEPARTMENT

A new editorial department takes a bow with this issue of MINNESOTA MEDICINE. By courtesy of the Editorial Committee and with approval of the Council, one page in each issue will henceforth be reserved for publication of practical information to physicians in the field of industrial health.

The importance of this new field was recognized in Minnesota even before the national defense program invested it with a special urgency. It was early in 1940 that Dr. B. S. Adams, as president of the Minnesota State Medical Association, first appointed the committee to work in Minnesota with the newly organized A.M.A. Council on Industrial Health and also with the new industrial program established under the State Department of Health.

Information Needed

With more than $100,000,000 worth of defense contracts now in operation in Minnesota, each of them with a clause for the protection of the health of the worker, the responsibility of the committee for protecting the interests of Minnesota physicians is clear. Furthermore, the need for a means of reaching every physician in the state with regular, up-to-the-minute information about methods of protecting the health of workers is more urgent than ever before.

Basis of Program

Essentially, of course, protective measures introduced in the defense industries are no different from measures which should be in force in all industries, big and small. A good industrial health program is simply good preventive medicine applied to men and women at work. Its basis is two-fold. First, it must study and control working conditions and provide all possible medical and engineering control measures against occupational hazards. Second, it must study the physical condition of the worker with the object, not merely of providing good first aid for injuries, but of keeping the workers physically fit for the job, and of avoiding absenteeism, which is far more expensive in the long run than accidents and compensation. The basis for keeping workers up to par is of course the ethical and comprehensive physical examination with periodic check-up wherever it is indicated. For actual treatment or repair of defects, brought to light as a result of such examinations, the worker is referred to his own physician outside the plant.

The direct result of a well run plant medical service, incidentally, has been shown, over and over again, to be a marked increase in the demand for medical services to the workers made upon physicians of the surrounding community. Generally, the increased demand extends to the worker's family, also, and, all told, the extension of such service is undoubtedly a sound approach to the extension of preventive medicine to the entire American people.

In Future Issues

Future articles under sponsorship of this committee will cover in more detail the actual requirements of modern ethically governed industrial medical departments, including proper physical examinations for workers, proper occupational placement in the plants, depending upon the condition of the worker; rehabilitation and periodic check-ups; the relationship between the plant doctors and other physicians in the community; the function of the public health nurse in industry; the essential function of internists as well as surgeons in the industrial health program. In addition, the work of the newly established Division of Industrial Health of the State Department of Health should be explained in detail, especially the technical medical and engineering advisory assistance provided to industry for the control of occupational health hazards such as dusts, fumes, gases and other toxic materials.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 9, 1941

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 9, 1941. Dinner was served at 7 p.m. and the meeting was called to order at 8:10 p.m. by the president, Dr. John M. Armstrong.

There were fifty-four members and four guests present.

Minutes of the March meeting were read and approved.

There being no further business to come before the society, the scientific program followed.

PROBLEMS ENCOUNTERED IN CARCINOMA OF THE COLON AND RECTUM*

MAX ALBERTS, M.D.

Saint Paul, Minnesota

In considering patients with carcinoma of the large bowel, it is interesting not only to study them from the standpoint of the malignancy itself, but also to consider the general condition and complicating factors that are often present in these individuals. With this thought in mind, we were prompted to make a study of all patients with colonic malignancy who entered the Ancker Hospital, St. Paul, from January 1, 1931 to January 1, 1941; this group comprised 207 patients, 128 males and 79 females, their grouping as to age being shown in Table I.

TABLE I. AGE GROUPS

10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
1	3	11	15	40	73	50	14

Youngest (Male) 18

Oldest (Male) 90 Average 63 plus

The patients seen at the Ancker Hospital, or any comparable hospital, present more problems than those seen in private practice, as will be demonstrated by the analysis of this series. Because few if any surgeons throughout the country have a similar number of this type of case in private practice, comparable statistics are rare although Lockhart Mummery's figures show that in cases of carcinoma of the rectum his mortality was 3% as against 14% in the cases he handled in a charity ward.

A careful review of the histories of this group of patients reveals that there were only seventeen who had no other demonstrable disease. The largest group, which numbered seventy-nine, were those suffering from various forms of cardiovascular disease, hypertension and associated arteriosclerosis. These patients were all individuals who had been and were at the present time under the care of physicians for some condition falling in this classification. No individual was classified as having a hypertension unless the blood pressure was over 185 systolic, and not a few were decompensated on admission. Forty-one patients came into the classification of those having some condition pertaining to the genito-urinary system, the most common condition being hypertrophied prostate, with associated cystitis and pyelonephritis. Nine patients were definitely psychopathic, which naturally made the finding of colonic malignancy often an accidental one. Syphilis, acute cholecystitis, fibroid (large and multiple), pregnancy, tuberculosis, diabetes, primary anemia, incarcerated hernia and pneumonia were other conditions adding to the problem.

Considerable thought had to be given to individual cases as to just when and how the various conditions present should be handled. One woman in this group entering with a carcinoma of the recto-sigmoid developed an acute cholecystis with jaundice and it was necessary to perform a cholecystectomy before the lesion in the bowel could be operated upon. In the case of a complicating pregnancy, it was advised after consultation that the uterus should be emptied before resection be attempted. This was done. However, in this particular case numerous metastases were found throughout the peritoneal cavity upon exploration. In dealing with another individual in this group, it was necessary to operate for an incarcerated hernia. In another case a subtotal hysterectomy for large and multiple fibroids was done because of repeated severe uterine hemorrhages. Two of the patients in this group were admitted to the hospital with bronchopneumonia, and it was only in doing a complete physical examination that a lesion pertaining to the large bowel was demonstrated. Thus both individuals were subjected to resections a short time after a severe pneumonia. In the cases presenting diabetes, primary anemia and tuberculosis, close coöperation between the internist and the surgeon was adhered to at all times with the thought in mind of having the patient in the best possible condition before such major operation was attempted.

A goodly number of individuals entering the hospital had obvious metastases which could be readily demonstrated on initial examination, and although these patients should probably not be placed in this group, nevertheless it was the most hopeless group that was assigned to the surgical service. Twenty-five patients did not apply for admittance to the hospital until a rather complete obstruction manifested itself, and obviously these patients presented a more or less desperate picture as all similar obstructions do.

Symptomatology

Practically the entire group of patients presented the classical symptoms that have so often been described

*Inaugural Thesis.

in conjunction with malignancies of the large bowel, but I believe it is worth-while to briefly restate the cardinal complaints taken from the history.

The average duration of symptoms in this particular group was approximately nine months, the shortest being five days, the longest giving a typical history relating to a lesion of the large bowel for five years. One hundred sixty-five of these patients gave a definite history of change in bowel habits. Of this number sixty-eight complained entirely of constipation, forty-two reported periods of diarrhea, while fifty-five complained of alternating diarrhea and constipation. Due to certain factors such as being unable to speak English or being too weak to give an accurate history, we were unable to obtain a history pertaining to this phase from seven patients, leaving a remainder of thirty-five patients who apparently had had no change in this respect. Thus we see that approximately 80% had a positive response as to change in bowel habit.

Seventy per cent of this group reported weight loss, the average of the entire group showing a sixteen pound loss since the onset of the symptoms. It must be said that this figure cannot be taken with too great a reliability as a number of the patients estimated the amount lost.

Another interesting phase in the symptomatology was the question of pain, and contrary to Rankin's report it was surprising to note that 172 of these patients had a definite complaint of pain varying in the time of onset. Twenty-eight of the group stated that they never had any pain whatsoever, and as listed before, seven were unable to give an adequate history. This pain varied in character but can briefly be divided into two groups: (1) those who complained of dull aching pain or a sensation of fullness in the rectum; and (2) those who complained of abdominal distress. In the latter group this pain too was often difficult for the patient to describe, ranging from periods of mild distress to hard and severe colicky pains. Patients noting blood in their stools numbered 113, fourteen were questionable, and eighty of these individuals had never noticed anything resembling blood in the stools. A history of emesis was reported by fifty-one patients in this series. True also was the fact that of the twenty-five who entered the hospital acutely obstructed and naturally vomiting, fifteen had never had emesis until the obstruction had become quite completed, while seven patients reported the vomiting always accompanied their so-called attacks of pain.

Laboratory Data

With the exception of the cases of carcinoma of the rectum and lower rectosigmoid, the diagnosis of course was confirmed by roentgenological examination. Routine proctoscopic examination was carried out in all lower bowel lesions and often tissue for microscopic study was obtained.

It was noted that the average hemoglobin was 51 per cent, the lowest being 16 per cent, the highest 94 per cent, with a corresponding fluctuation in the erythrocyte count. A study of the anemia produced in carcinoma of the large bowel, particularly those involving the right colon, has been extremely interesting and various theories have been advocated in trying to explain this more or less constant finding. Alvarez, Judd, MacCarty and co-workers gave careful study to this problem some years ago, but the probability is that slow oozing from the new growth is the primary factor in producing this more or less constant blood picture of secondary anemia. Our findings of more severe anemia in lesions of the right colon are in agreement with those of similar groups reported.

Perforations

Perforations were noted in twenty-four of this series of cases. However, on further analysis we find that the terms perforation and fistulous opening were used somewhat interchangeably especially in lesions of the rectum and rectosigmoid, eight of the patients with primary lesions in these locations having had fistulous openings between the bowel and the vagina or bladder. This group therefore includes not only true perforations, but the resultant picture caused from destruction by the invading malignancy.

The sites of the other described perforations were divided as follows: sigmoid six, cecum seven, splenic flexure one, ascending colon one, descending colon one. Various opinions have been expressed as to the direct cause of perforation in the presence of colonic malignancy, that is, whether said perforations are due to a breaking through of the new growth, a spontaneous rupture because of the inflammatory process almost always accompanying such conditions, or an associated diverticulitis.

Just how such a condition must be dealt with varies with different individuals. Nevertheless, resection should never be carried out immediately in the face of such a finding. The cases in this group were handled usually by draining the abscess after it had completely walled off, and occasionally supplementing this procedure with a colostomy some distance from the pathological process. Some surgeons prefer, where it is possible, to do a short-circuiting type of operation in such a case rather than a colostomy. Colostomy is always indicated where the vagina or bladder has been invaded, solely because of the comfort it affords these unfortunate individuals. In by far the greater percentage of cases presenting such a complication, the diagnosis is readily made, with findings familiar to all. Dixon and Weber have brought out the fact that a perforating lesion can sometimes be diagnosed by the saw-tooth type of temperature that is produced following the administration of vaccine, this type of temperature usually lasting from five to six days in contrast to the forty-eight-hour rise usually encountered.

Operations Elsewhere

A number of the patients with carcinoma of the colon had had various types of treatment and surgical procedures prior to entering the Ancker Hospital, and this group is classified as follows:

Eleven patients had had exploratory operations else-

where, at which time multiple metastases had been found and colostomy performed. Five who had had completed operations, four for carcinoma of the rectum and one for carcinoma located at the hepatic flexure, the average time since operation having been two and one-half years, were now admitted because of mestasis. Two patients had had first stage operations elsewhere, the first having been for drainage of an abscess as a result of perforating carcinoma of the cecum, which was later resected at the Ancker Hospital; while the second had had a colostomy elsewhere, and was then sent to the Ancker Hospital where a posterior resection was carried out for carcinoma of the rectosigmoid. Four individuals in this particular group had had radium treatments for carcinoma of the rectum—seven, nine, twenty-four and twenty-nine months prior to admission. One patient had had a combination of fulguration and radium, and a second had had fulguration treatment for carcinoma of the rectum two years before. It was necessary that a colostomy be done on these two patients due to the resulting stricture which previous treatment had produced.

One can readily see that by far the greater percentage of this group of patients came to the hospital in a more or less hopeless state and because of the fact that proper care could not be given them in their own homes.

The reluctance of individuals to accept surgical procedures when this condition is originally diagnosed is illustrated by the three individuals in this group entering the hospital with obvious metastases who had been diagnosed one and a half, two years and thirteen months previously, and had refused operation elsewhere at that time. Six patients seen relatively early at the Ancker Hospital refused to submit to any operative procedure although one in this group refused a posterior resection after colostomy had been made.

Failure to accept early prescribed treatment as was encountered here is one of the chief factors in elevating the mortality statistics in colonic malignancy.

Metastasis

In dealing with carcinoma of the large bowel, as with malignant lesions elsewhere in the body, the bugbear always before us is the question of metastasis, a question which with our present knowledge is not completely understood and the presence or extent of which cannot be accurately determined pre-operatively.

Pathologists seem in agreement that malignant lesions spread either by direct extension, through the lymphatics, or by the blood stream, particularly through the venous system.

In studying the various sites of metastasis in this particular group of cases, our conclusions and findings correspond to similar studies by other men and clinics. In this group of cases by far the most frequent site of metastasis was to the liver and to the immediately surrounding lymph-nodes, but there does not seem to be any part of the body where the secondary lesion may not manifest itself unless it be in the skeletal parts of the body. Thus we find in this particular group that in addition to metastasis to the liver and regional nodes, the pancreas, peritoneum, kidneys, bladder, vagina, pleura, lungs and even the brain may become secondarily involved.

A case in particular, falling in the last group, was that of a colored woman, aged forty-nine, who presented herself at the hospital in a stuporous condition with a rather indefinite history of having fallen. Because of the physical findings it was thought that she was suffering with a lesion of the brain, such as a subdural hemorrhage or tumor, and that exploration was advisable. Decompression was carried out, a tumor was found, and postmortem a few days later showed the lesion in the brain to be a metastatic carcinoma from a primary lesion in the sigmoid, and save for the fact that there were a few carcinomatous glands in the immediate area about the sigmoid, no other metastatic involvement could be proven.

Two other cases were noted in this group with physical findings essentially negative, outside of those pertaining to a carcinoma in the large bowel itself, with the exception that both had a marked hypotension, having approximately a systolic blood pressure of 80 and a diastolic varying from 30 to 40. One of these individuals was quite certain that his blood pressure taken a year before was in the neighborhood of 135 systolic, while the other was unable to give us any data as to previous blood pressure readings. Both of these patients were explored and because of demonstrable metastasis in the peritoneal cavity no further operative procedure was carried out. Postmortem examination within two weeks revealed marked involvement of the adrenal glands. Should a future finding such as marked hypotension make us suspicious of suprarenal involvement?

Size of the original lesion and duration of symptoms cannot be taken as a guide in predetermining the amount of secondary involvement to be encountered. I believe that every physician has had patients under his care with symptoms of extremely short duration and an extremely small primary lesion to all intents and purposes extremely amenable to surgery, only to find at operation extensive metastases throughout the peritoneal cavity and possibly to other parts of the body. I believe that it is an accepted fact that carcinoma of the rectum is prone to metastasize much faster than lesions in other parts of the large bowel.

How accurate are the findings on exploration with respect to metastatic lesions is a question that has always given me considerable concern. Involvement of the regional glands and of the liver can usually be satisfactorily demonstrated by the surgeon at the time of exploration. Nevertheless one occasionally finds what he may think to be a perfectly operable lesion, where he is unable to demonstrate secondary involvement, and yet metastasis has manifested itself in some locality which the exploring hand has been unable to demonstrate. A case in our group demonstrates this point very well, where a carcinoma of the rectosigmoid was explored, resection carried out, with postmortem findings one week later showing no evi-

dence of metastasis in the peritoneal cavity and yet the pleura showed considerable involvement.

Cases such as this will readily demonstrate the difficulty of arriving at an accurate conclusion as to the presence or absence of secondary involvement. I have discussed this phase with various members of the profession and in their opinion the percentage of accuracy varies from 50 to 90 per cent. The most accurate work done on this problem I believe was recently carried out by Dr. C. W. Mayo in which he carefully reviewed the postmortem findings in some 160 cases, all of the deaths having occurred not more than three weeks after exploration. By comparing the findings of the surgeon, as reported by him immediately after his surgical procedure had been carried out, with the findings of the pathologist, it was shown that the surgeon had approximately 17 per cent chance of being wrong. This, in my opinion, is an exceptionally gratifying percentage, as I believe that all men having considerable experience in this field will agree.

It is pertinent, I believe, to briefly discuss the operative procedures that should be employed in the face of secondary involvement, particularly to the regional lymph-nodes. Some years ago Bloodgood advocated the resection of the involved portion of the colon even in the face of secondary involvement. His logic for advancing such an idea was that in the first place one could not be definitely sure whether or not the nodes involved were cancerous in character or merely inflammatory; and secondly that resection in the face of metastasis gives the individual considerable more comfort than any of the short-circuiting procedures so often resorted to. I have had one experience in this respect where, on exploring a patient with carcinoma of the ascending colon, numerous nodes were found which at that time led me to believe that the resection of that portion of the colon was inadvisable. I removed several of the nodes for microscopic study and then made an ileocolostomy. It was a considerable surprise when the pathologist reported that there was no evidence of malignant involvement of the nodes removed. This patient refused further operation and although she was lost track of I believe that had I followed Bloodgood's advice an excellent result could have been obtained. Resection is very often more easily performed than various anastomotic or short-circuiting procedures, and it has been shown by Mayo that while there is a slight increase in the mortality rate where resection is performed, nevertheless, there is a definite prolongation of life, with considerably mor comfort to the patient. The theory that removal of the primary lesion causes a slowing or even a temporary regression of the metastatic process seems to have considerable support.

Treatment

Before discussing the types of operations used in this series of cases, I would like to briefly review the history pertaining to large bowel surgery.

Littre, in 1710, after observing the death of an infant with an imperforate anus, was the first, I believe, to suggest colostomy. Pillore, in 1776, was the first to successfully do a cecostomy, and Dubois, in 1783, performed the first iliac colostomy. The left iliac colostomy was first done in 1793 by Duret, the indication being an imperforate anus, and Baudens in 1842 improved on Duret's colostomy, and it was this modification which is so universally used today. The English claim that Paul of Liverpool, in 1892, was the first to do what is now known as the Mickulicz type of operation for carcinoma of the colon. However, it has been said that Maydl had performed similar operations thirty years before with Block, Volkman and others practicing this procedure well ahead of Paul. Schede, in 1879, made the first double barrel colostomy on an occasion when he was unable to anastomose the bowel after resection. In 1885, Kraske performed the first resection of the anus and rectum. While Block of Copenhagen, in 1892, was the first to exteriorize the tumor and bowel without resection, it was Mickulicz beginning in 1902 who made this procedure so popular.

Of course other men aided immeasurably in the advances in large bowel surgery, notably Billroth and Halstead with their work on intestinal anastomosis, and Dr. William Mayo who contributed so much to this field particularly to lesions involving the right colon.

The site of the primary lesions in our group of cases is shown in Table II.

TABLE II

Rectum	Rectosigmoid Sigmoid Descending Colon	Transverse Colon	Cecum Ascending Colon Hepatic Flexure
94	67	4	42

The operative procedures in our series of course depended on the type of lesion, condition of the patient, and the particular surgeon handling the case. A list of the types of procedure is shown in Table III.

TABLE III

Colostomy—Post Resection	22
Colostomy—Resection of Sigmoid	14
Mickulicz—Sigmoid	3
Combined—Abdominal Perineal Resection	4
Resection of Cecum	6
(a) Primary	4
(b) Two stage operations	2
Colostomy—Resection of Transverse Colon	2
Ileocolostomy—Resection of Ascending Colon	1
Ileocolostomy	2
Fulguration	2
Decompression—Carcinoma of Sigmoid	1

It was interesting to note that of all the patients treated in this group, only four were found suitable, that is, in condition to withstand a one stage combined abdominal perineal resection. In a number of these patients with the lesion involving the left colon, preliminary colostomy was carried out followed by daily irrigations with the purpose of not only cleansing the bowel but giving the inflammatory process a chance to subside before resection was attempted. I realize that this is a debatable procedure in that certain men of

experience claim that cecostomy does not allow complete emptying of the fecal stream and that the bowel cannot be cleaned to any great extent despite the technique employed and the amount of fluid used in the irrigation. Personally I have never adopted this procedure, but I have had the opportunity of seeing a number of cases where this technique was followed and I can vouch for the excellent results which were obtained.

In addition to the list presented in Table III, thirty additional patients underwent exploratory operations where numerous metastases were found, and colostomy was performed, due to the already present or anticipated obstructive symptoms.

Those patients entering the hospital acutely obstructed, of course, presented the most difficult problem, and the relief of the obstruction was of the prime importance at the moment. Nasal suction was instituted immediately, but this procedure alone was only completely satisfactory in five cases, the remaining twenty of this group having to have some form of colostomy. Not only in the acutely obstructed group but in the majority of the cases dehydration had to be corrected and transfusions were used in practically 80 per cent of the cases.

In the past few years it has been found in general that some type of spinal anesthesia is the anesthetic of choice in dealing with this type of case. This type of anesthetic has been used practically routinely in the handling of these cases.

Thus, in the accounting of 207 cases studied, we find that six patients entered the hospital with a carcinoma of the large bowel, in so extreme a condition due to some illness not associated with the intestinal tract, such as cardiovascular disease, pneumonia, uremia, etc, that they expired within thirty-six hours after admittance. No operative relief could be attempted in this small group despite Finsterer's statement that "no patient with carcinoma of the bowel is too old or too weak to be operated upon."

Three patients died in the hospital of other causes and carcinoma of the colon was found at postmortem examination.

Of the total group 106 entered the hospital with obvious metastases, many having undergone operations at some other hospital or at the Ancker Hospital at some previous date.

Five of the group refused operation, and an additional one allowed a colostomy but refused posterior resection.

This leaves eighty-six patients thought suitable for surgery. Fulguration treatments were given to two patients with carcinomatous lesions located in the rectum, because of the advanced age of the patient.

The mortality varies considerably in reports published dealing with this particular subject, ranging from 10 to 63 percent. With such variance it is obvious that a difference of opinion exists as to just what should constitute operative mortality, that is, with particular reference to the time limit after operation.

In the eighty-six patients operated upon at the Ancker Hospital, we had a mortality of slightly in excess of 17 per cent and these figures were based on the fact that the patient had apparently recovered from the operation and death had not occurred within three weeks after the operative procedure was completed.

In reviewing the postmortem findings, we find that peritonitis was still the largest individual factor in causing mortality, which I believe is the general experience elsewhere. None of the patients in this group had been given any form of immunizing agent or vaccine, so I am not prepared from personal experience to discuss this particular subject. Mayo, Dixon, Coller and Fansler believe that it has a definite place in the armamentarium of those doing this type of work, Dixon believing that there has been a thirty-six per cent decrease of peritonitis in his series since using a vaccine, while Mayo believes that it is a responsible factor of safety in about 1.5 per cent of cases. Rankin and others apparently have little or no faith in this pre-operative vaccination. Granting that the use of this vaccine has a definite place, I still believe that probably the largest percentage of peritonitis is due to faulty technique.

Although the number of cases was small, it was striking to note that the death rate following colostomy as a palliative measure was five to one over colostomy which was followed by further operation. This too seems to be a rather constant finding as reported in the literature. Two of the deaths which followed colostomy in our group were the result of small bowel obstruction, the bowel having become wedged between the proximal portion of the bowel forming the colostomy and the parietal peritoneum. As a result of this finding I have always attempted to place one or two interrupted stitches between this part of the bowel and the peritoneum so that the small bowel cannot work its way into this area and thus become obstructed.

The remaining causes of death in this group were embolism, hemorrhage, bronchopneumonia, and gas bacillus infection which followed the drainage of an abscess about the cecum due to a perforating carcinoma.

Conclusions

It is quite obvious that the type of patient with carcinoma of the large bowel seen in a hospital such as the Ancker presents many more problems than those seen in private practice, for reasons I believe that are readily understandable.

While we are extremely interested in lowering the mortality statistics for any type of surgical procedure, I believe that the mortality rate from the Ancker Hospital is comparable to that of other similar clinics and it is gratifying to report that none of the patients with carcinoma of the rectum had ever been operated upon for hemorrhoids.

As regards the problem of metastasis and the recognition of such, there must naturally be an error in the failure to recognize such in a certain percentage of cases.

It was Bloodgood who said that it was the failure of the patient himself to consult medical advice when symptoms first presented themselves which still leaves so much to be desired in the satisfactory outcome of these cases, and not the failure of the examining physician to recognize the condition.

According to Lord Moynihan, "few places in the body

affected by carcinoma are so accessible and safe to curative operations, yet the relative good prognosis in carcinoma of the colon is dependent on several factors." It is some of these factors that we have endeavored to bring out in this review.

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Discussion

Dr. E. M. Jones, Saint Paul: I am very much interested in Dr. Alberts' review of the cases of carcinoma of the large bowel at the Ancker Hospital. I think it is pretty generally agreed that the cases of carcinoma of the large bowel are classified as bad risk cases and require our utmost attention to preoperative preparation and postoperative care, in order to keep down the mortality and morbidity rates.

There is one type of case in this group that has been a problem to me. It is the instance in which there is a lesion of the sigmoid and it is difficult to differentiate between a carcinomatous lesion and diverticulitis. I recall one man who came in to see me forty-eight hours after the onset of his illness. He had a temperature of 101°, with a history that he had passed a little blood by stool and he had very marked tenderness and some muscular spasm in the lower right quadrant of the abdomen. My first impression was that he had a sigmoiditis or diverticulitis. He was hospitalized and after a few days a proctoscopic examination was made, which was negative. The roentgenologist reported a lesion in the lower sigmoid which might be due to diverticulitis. This man was advised to have an operation, but he felt so well in 10 days that he insisted on going home. When I saw him at my office a week later he refused further investigation and returned to work. I did not hear from this man for a year, and at that time I found that he had had no further medical attention until he became obstructed. Exploration was carried out and an inoperable tumor was found.

We have a seventy-seven year-old man in the hospital at the present time who presented very much the same problem. However, an exploration was done and he was found to have a carcinoma. A resection was carried out and his progress has been very satisfactory.

The point I wish to emphasize is that these patients should be explored and the final treatment of the lesion be left to the discretion of the individual surgeon.

Dr. Harold Hullsiek, Saint Paul: I should like to compliment Dr. Alberts on his work. An analysis and review of any subject always leaves one with the impression that he has done no original or creative work. A statistical review is important in that it permits reasonably safe generalizations. I think this is a very creditable *arbeit*.

Dr. Alberts made little mention of complications. I wonder if these cases were studied with reference to ensuing bladder disturbances. It seems to me that this complication has not been sufficiently stressed in discussions of this subject.

I have had several distressing experiences with prolonged supression of urine following posterior resections and I should like to ask him what proportion of bladder function resulted in this series of cases.

Dr. Arnold Schwyzer, Saint Paul: I think the picture Dr. Alberts has developed is a very interesting one showing the unfavorable conditions that the surgeon is liable to find in such a community hospital. He sees so many complications, so many coincident troubles, especially in older people. The material is of necessity much worse than the one a surgeon encounters in his private practice. It is interesting to hear of all these complications and difficulties.

Dr. Alberts mentioned a carcinoma of the colon where many glands were enlarged, and he made only a decompression operation. Afterward it was found these glands were not malignant but inflammatory. This is not an infrequent finding. If a colostomy is to be made, the Devine method (where the gut is divided and the two ends are brought out through two separate openings) is at times too much of an operation. I have seen very solidly fixed carcinoma of the sigmoid become quite movable after a preliminary colostomy and cleansing of the gut. What seemed carcinomatous fixation was only inflammatory infiltration. A simple colostomy relieves the pressure and the gut can be cleansed. It is not of importance to disinfect that gut elaborately. The main thing is the relief from the severe peristaltic cramps and the enormous pressure in there. It is from this gut that one gets absorption and inflammation. I have repeatedly made only an ordinary colostomy and washed out the gut, not with any idea of sterilizing the gut thoroughly, and have seen the immobility disappear.

As to metastases, I remember very important pathologic findings that came out of the University of Heidelberg a good number of years ago. The publication was by Colmers and Peterson who worked under Czerny. They had made exact microscopic studies in patients who died of carcinoma of the rectum at the Clinic. It is well known in carcinoma of the rectum that you do not have lung metastases except at a very late stage. You get metastases other places, but not in the lung. All these cases were operable cases and in all they found single-cell carcinoma emboli in the lungs.

(Continued on Page 692)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY
Stated Meeting, Thursday, April 3, 1941

President JAMES A. JOHNSON, M.D., in the Chair

Secretary, R. F. McGANDY, M.D.

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS

Report of Two Cases in Sisters

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By congenital hypertrophic pyloric stenosis I refer to that definite clinical entity in which there is always an increased thickness of the pyloric sphincter with symptoms appearing in the first few weeks of life.

The first case was reported by George Armstrong in 1777, but until 1898 only seventeen undoubted cases had been reported. In 1841 Williamson of London reported another case. The true pathology, up to that time, was not known. Landerer reported another case in 1879 and for the first time the name, congenital pyloric stenosis, was applied to the condition. In 1887 Hirschsprung initiated our modern interest in the disease in infancy. In 1896 Finkelstein first described the palpable tumor in the epigastrium associated with the symptoms that had previously been described. The type of vomiting was also characterized then—projectile.

The condition today is quite commonly recognized and it is estimated that one in four hundred male infants are affected. The condition is found seven times more frequently in male babies than in female. After an exhaustive review of the literature, we have failed to find anywhere a report of two girls in the same family being affected, with one exception, that of twin girls reported by Thompson and Gainsford in the *British Medical Journal* in 1935.

Twenty men have reported two or more male members of a family having had this condition, several of them being in male twins.

An instance of hypertrophic pyloric stenosis affecting female siblings was encountered in our practice. A review of the literature of reported cases of the condition in siblings, with particular reference to the sex of the individuals, has been made. One instance has been found in which the condition affected sisters, and these were twins.

Numerous authors have noted familial occurrence of hypertrophic pyloric stenosis. Several observers, including Sheldon, Caulfield, and Thompson and Gainsford, have observed the condition in relatives other than siblings. Huebner, Svensgaard, Still and others have noted cases in siblings, but sex is not mentioned.

Unexplained features are the great muscular hypertrophy, the phenomenon of occasional cure without surgery, the prevalence in male children, the frequency with which it occurs in the first child of the family, and the disappearance of the tumor after the Fredet-Rammstedt operation.

Although we have no proof that the hypertrophy is congenital, most authorities agree that a condition which almost invariably makes its appearance within the first three weeks of life and not infrequently in premature infants, in twins, or in several members of the family, must be congenital. Furthermore, it does not seem possible that the degree of hypertrophy could result in the first few weeks of life.

The clinical picture of this condition is usually as follows: the baby appears perfectly normal at birth, nurses well, and for the first week or two gains in weight. Then, without any known cause, the child starts to vomit occasionally. As time goes on, the vomiting becomes more frequent anl becomes projectile in type. The child's appetite usually remains good and he usually takes the proper amount of food. As the vomiting continues, the child commences to lose in weight, the bowels become constipated, and the urinary output is scant. Visible peristalsis appears in the epigastrium, the waves starting on the left hand side and progressing downward and to the right. As the condition progresses, these peristaltic waves become more visible, especially if the patient loses weight and becomes emaciated. Occasionally the symptoms will rather suddenly disappear and the patient appears apparently normal again, only to have a recurrence of the symptoms a few days later. The vomiting may appear during or immediately after a feeding, and may be greater in amount than the amount of food taken at the preceding feeding. The vomitus is usually free from bile.

Visible gastric peristalsis is considered to be a cardinal symptom. In most cases a palpable tumor-like mass can be felt in the epigastrium, slightly to the right of the midline. This mass is most easily palpated in extremely emaciated infants, in severe cases during the time that peristaltic waves are visible or shortly after projectile vomiting. A definite variation in the hardness can frequently be tested in the mild cases or during convalescence.

While very early diagnosis may be difficult, it is usually not difficult if vomiting has persisted for more than a week. An accurate history and a close inspection of the abdomen for the visible peristaltic waves and palpation of the tumor in the epigastrium help in making the diagnosis. It is quite certain that hypertrophic pyloric stenosis exists if the type of vomiting is projectile, if the vomiting appears in the first three weeks of life, if the vomitus is free from bile, if there is a continuous weight loss, a palpable tumor in the epigastrium, visible peristaltic waves, and if constipation and oliguria are present. This chain of symptoms and findings of these physical signs should lead the diagnostician to make a fluoroscopic examination of the stomach. While the x-ray is used in making the

diagnosis in most of these cases, it is not absolutely essential in a large majority of cases.

The development of the modern operation for this condition is interesting. Jejunostomy was the first operation proposed and performed. Following, a pylorectomy was done. Following that, gastro-enterostomy and pyloroplasty. The first successful gastro-enterostomy was performed in 1898. The procedure became the operation of choice and remained so for fifteen years. The first pyloroplasty of the Heineke-Mikulicz type was performed in 1900. This operation involved a complete pylorotomy, cutting through the mucosa as well as the other tissues. Soon after that, a V-shaped submucous pyloroplasty was advised and successfully done. In 1907 Fredet performed successfully a submucous pyloroplasty by means of a straight incision over the anterior part of the pylorus extending through the serosa and the muscular layer but not through the mucosa. This longitudinal incision was then transformed into a transverse wound by the use of sutures put in parallel to the long axis of the bowel. In 1912 Rammstedt performed an operation similar to that of Fredet, but omitted the transverse suture, leaving the pyloric wound open. The operation done by most surgeons today is a modification of Fredet's and Rammstedt's operations and is known by their names. There are modifications of this operation described and done, notedly by Straus of Chicago, who utilizes a flap to cover the exposed mucosa. An important feature of the operation is the separation of the mucosa from the muscular layer the whole circumference of the bowel.

Most surgeons now operate on all cases except in rare instances where the symptoms are mild and the infant is 2.5 or 3 months old. The duration of the symptoms and the amount of weight loss are perhaps the most important factors in determining the prognosis.

Pre-operative treatment is the principal factor in determining the surgical mortality rate. Essential points in that treatment are restoration of fluids and chlorides by subcutaneous injection and administration of glucose in water by mouth as a substitute for milk in most cases. The effect of the treatment is startling many times. When weight approaches normal (which is usually in 2 or 3 days), surgery should be resorted to under drop ether anesthesia.

Operation

An incision about 4 cm. is made through the right rectus muscle beginning just below and 1.5 cm. to the right of the xiphoid cartilage. This places it over the right lobe of the liver, necessitating a retraction of the lobe and reduces the possibility of postoperative herniation. The tumor mass can easily be felt and elevated between the thumb and index finger of the left hand. An incision is made through the superficial portion of the mass and the muscle fibers further separated by means of mosquito forceps until the mucous membranes of the stomach fills the wound. Great care is required in the duodenal portion as the circular muscle extends into the duodenum much like the cervix projects into the vagina, and, unless care is taken, the mucosa of the duodenum is easily opened. If this opening occurs and is unrecognized, there is the danger of postoperative peritonitis. Bleeding is usually minor and no ligatures are generally required. The wound is closed by continuous chromic catgut, size 00, in the peritoneum and anterior rectus sheath. Hypodermoclysis (80 to 100 c.c.) is given daily for three days and all food given with medicine dropper. A few ounces of 50 per cent breast milk are given four hours after the operation and gradually increased. If the baby is nursing, it can be put to breast on the fourth or fifth day.

The cases I report tonight are unusual in that they were sisters born three years apart but each developed its symptoms a few weeks after birth.

Case 1.—J. H.,* female, five weeks of age, was admitted to the hospital on December 1, 1934, with a history of loss of weight, vomiting, and diarrhea of four days' duration. Birth weight was 3.543 kilograms (7 pounds 13 ounces), and she had gained weight and been entirely well until November 27, 1934, when vomiting began which was described as projectile. At first, water was retained; a few days after onset, nothing was retained.

The physical findings on admission were: weight 4.004 kilograms (8 pounds 13¼ ounces); temperature 100°; evidence of dehydration; decreased turgor of the skin; and excoriation of the skin of the buttocks.

Proctoclysis, thickened-cereal-breast-milk formula, and atropine were given. Vomiting continued on this régime. A gastro-intestinal study on December 10, 1934, revealed almost complete gastric retention at two hours, 90 per cent after four hours, and 80 per cent at six hours. Since admission the weight had dropped to 3.926 kilograms (8 pounds 10½ ounces).

On operation December 11, 1934, a thickened fibrous pylorus was found which was incised by the Fredet-Rammstedt method.

Intermittent vomiting continued postoperatively and ceased on the seventh postoperative day. The patient gained weight steadily and was discharged on the ninth postoperative day, weighing 4.070 kilograms (8 pounds 15⅝ ounces).

She is now a healthy girl of six and a half years.

Case 2.—N. H., a female, seven weeks of age, sister of the above patient, was admitted to the hospital on January 19, 1938, with a history of vomiting of ten days' duration and loss of weight of three days' duration. The birth weight was 3.742 kilograms (8 pounds 4 ounces) and weight gain had been progressive to three days before admission when it was 5.338 kilograms (11 pounds 12⅜ ounces).

Physical examination showed a weight of 5.025 kilograms (11 pounds 1¼ ounces); temperature 99.6°. There were visible peristaltic waves extending from the left upper quadrant to the right lower quadrant. Urine examination was negative. Bleeding and clotting time were normal.

Thickened cereal feedings and Hartmann's solution subcutaneously were given. Vomiting continued and the weight dropped to 4.850 kilograms (10 pounds 11 ounces).

X-ray study on January 21, 1938, showed a dilated and atonic stomach with almost complete retention at two hours. 70 per cent at four hours, and 50 per cent at six hours.

At operation on January 22, 1938, a whitish, thickened pylorus 1.5 inches long and 0.5 inch in diameter

*Dr. Ed. Anderson, consultant.

was found. This was incised by the Fredet-Rammstedt method.

Intermittent emesis continued to the ninth postoperative day. The patient was discharged on the fourteenth postoperative day, weighing 5.280 kilograms (11 pounds 10¼ ounces).

At present the patient is a healthy child of a little over three years age.

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TRANSURETHRAL RESECTION FOR BENIGN HYPERTROPHY OF THE PROSTATE GLAND*

C. D. Creevy, M.D.

Minneapolis, Minnesota

Benign hypertrophy of the prostate should be treated surgically when it impairs comfort or health and resists (as it usually does) medical management. There has been, and still is, a great increase in the number of patients seeking relief from this disorder, presumably due to the same factors which have produced the depression, the Townsend Plan, and Social Security, i.e., increased longevity. The number of males living past sixty-five increased from 1,900,000 in 1911 to 3,800,000 in 1936. In 1939 the average age at death of the industrial policyholders of the Metropolitan Life Insurance Company had reached 62.5 years, and the end is not yet.

Three approaches to the hypertrophied gland are available, the suprapubic, the perineal, and the transurethral. Suprapubic enucleation is easily accomplished but somewhat hazardous. Convalescence is often tedious. It is the operation of choice for the occasional operator, and for the very large glands.

Perineal enucleation requires mastery of an exacting technique. Because of the danger of injuring the rectum and external vesical sphincter, it is the most interesting (and exciting) of the three. However, mortality is low and results excellent in the hands of experts, although convalescence may be tedious, and incontinence is a bit too common for comfort in most hands.

Transurethral resection also requires an exacting technique, to be acquired only by a large experience not readily available to many surgeons. Its advantages are: low risk, short hospitalization, and good functional results.

It must be emphasized that the expert can avail himself of all three methods to good advantage.

Indications for Transurethral Resection

The precise indications for employing transurethral resection as compared to enucleation are not yet clear. It is generally agreed that resection is indicated in contractures, carcinomas which have extended locally, and "small to moderate sized" hypertrophies. It is argued that the configuration of the gland may indicate or contraindicate resection, but this is, in my opinion, incorrect. The only true contraindications are inability to insert the instrument, strictures too far back to permit their circumvention by urethrotomy, and hypertrophies so large as to necessitate more than two sessions or the employment of so much diathermy current as to inflict irreparable damage upon the prostatic remnant. One cannot describe the size of such a gland in terms of grams without knowing the skill, experience, and inclinations of the operator. In different hands, the size of the prostate which is "too large for resection" may vary from twenty-five to one hundred and fifty grams. In my own hands at present the upper limit is about one hundred and twenty grams.

Technique

Pre-operative drainage by catheter is employed when needed; i.e., for impaired renal function, acute infections with fever, and extra-urogenital disorders requiring treatment, such as diabetes and cardiac decompensation. To "drain" the robust individual with good renal function simply because he has residual urine is to invite catastrophe.

Spinal anesthesia is used for good risks without severe hypertension. The attendant relaxation and lowered blood pressure facilitate operation by reducing bleeding. A falling blood pressure is to be combated by use of Trendelenburg's position and intravenous

*From the Division of Urology of the Department of Surgery, Medical School, Minneapolis.

fluids, and not by the ill-advised administration of vasoconstrictors, since they often promote bleeding.

The instrument which I prefer is an illegitimate combination of those of Stern, McCarthy, Nesbit and, doubtless, of others. Its advantage is that it can be handled with one hand. The O'Conor sheath permits the insertion of a finger into the rectum, and is always used. Thus tissue may be displaced with one hand and cut off with the other.

Operation is begun on the roof of the prostatic urethra, where division of the anterior commissure permits the lateral lobes to drop backwards. Resection is then carried backward, and later medially, between the surgical capsule and the lateral lobe, first on one side, then on the other, until the lateral and median lobes are attached only by a narrow vertical pedicle. Bleeding from the cut surfaces is then controlled, and the pedunculated mass removed piecemeal. The objective is a pear-shaped urethra without intrusions into lumen or bladder, and a prostatic remnant which feels thin when palpated over the sheath of the instrument. The method outlined is that of Nesbit.

Control of hemorrhage depends primarily upon electrocoagulation at the time of operation, but the Foley bag is used routinely as an aid to hemostasis. Postoperative irrigation is carried out with a closed sterile system often enough to prevent plugging of the catheter by clots. Transfusion is employed freely, giving blood while there is still doubt as to whether it is needed; it is not infrequently begun during operation. Excessive postoperative bleeding is controlled by cystoscopic electrocoagulation.

The catheter is removed on the third day, or later if fever has not subsided by then. If urination is not comfortable and complete within three or four days of removal of the catheter, resection is repeated.

Results

Table I is a summary of the whole experience with transurethral resection at the University Hospital from April, 1930, to April, 1941.

Most conspicuous is the increase in amount of tissue removed from 3.3 grams in 1930 to 37.4 grams in 1941. If contracted glands were eliminated from the series, this figure would rise above forty grams. Since Alcock found that two-thirds of 500 consecutive specimens enucleated suprapubically weighed less than 30 grams, and since 1,000 consecutive hypertrophied prostates enucleated at the Mayo Clinic averaged 44 grams in weight, it is evident that the term "transurethral prostatectomy" is beginning to be justified.

The average mortality of 4.3 per cent is nothing to boast about, but the type of patient seen at the University Hospital and the circumstances surrounding his admission make it unlikely that much improvement can be expected, although this year's mortality so far is 2.5 per cent. The figure on hospital stay is especially satisfactory in view of the fact that nearly all patients come from out of the city, and the figure refers to the pre- and postoperative stays combined.

The number of enucleations done during the last five years is too small for statistical purposes. Radical perineal prostatectomy has been used in a few cases of operable cancer; perineal enucleation has been done some twenty-five times, more to develop the technique than from any conviction concerning its precise indications; and suprapubic enucleation, because of the risk involved, has been carried out only occasionally, usually for very large glands, or because of some contraindication to the other methods.

TABLE I. SUMMARY OF TRANSURETHRAL RESECTIONS
April, 1930, to April, 1941

Year	Number of Cases	Percent Repeated	Mortality Percent	Tissue Removed (Gm.)	Hospital Stay
1930	18	16	0	3.3	29.0
1931	27	25	3.7	3.1	31.0
1932	18	38	11.1	4.5	23.0
1933	102	22	3.9	9.7	20.0
1934	103	17	2.9	18.4	17.0
1935	133	29	3.0	22.3	13.0
1936	160	28	4.3	26.6	14.9
1937	133	23	7.5	20.1	17.0
1938	174	14	4.0	25.7	12.6
1939	167	22	4.2	26.9	16.6
1940	155	20	3.8	37	15.9
1941 (to April 1)	40	17	2.5	37.4	15.0
Total	1229	23	4.3	24.8	16.2

Conclusions

Increased experience with transurethral resection has led to increased applicability. Indications for enucleation decrease in frequency as experience with resection grows, so that enucleation is required only occasionally. Transurethral prostatectomy is becoming a reality.

Discussion

DR. T. H. SWEETSER: In his frank and modest way Dr. Creevy has given us a very interesting and instructive presentation of his experience with transurethral prostatic resection. He should be very proud of his results.

I agree with his statement that the removal of the adenomatous mass should be fairly complete to get the best results. I also agree that the surgeon's experience, his skill relatively in the different methods and his temperament may justifiably influence his approach to a particular case of prostatic hypertrophy. I use transurethral resection for perhaps 90 per cent of my cases of prostatic obstruction, but there are cases for which I prefer suprapubic enucleation and some for which I prefer perineal prostatectomy. The use of the Foley bag catheter, as used after transurethral resection, allows us sometimes to enucleate a large gland and then close the wound completely, depending on catheter drainage. Cystography in conjunction with rectal examination will help one in preliminary estimation of the problem in each case. I wish to show a few cystograms and to discuss their interpretation.

Dr. Creevy's excellent discussion of resection technic and after-care has fortified my own feeling in some respects, and has suggested a few modifications of my methods that undoubtedly will be helpful.

FRACTURES OF THE OLECRANON*

(Abstract of paper to be published later)

U. Schuyler Anderson, M.D.
Miland E. Knapp, M.D.
and
Daniel J. Moos, M.D.
Minneapolis, Minnesota

Although fractures of the olecranon are not common, the study of their management is of interest because the multiplicity of methods used to treat this fracture indicates that the end results have not been generally satisfactory. Thirty-two cases of this fracture were analyzed.

From 1934 to 1940 inclusive, 5,151 fractures, of which 32 or 0.61 per cent were fractures of the olecranon, were treated at the Minneapolis General Hospital. Recovery was complete with little or no loss of function in thirteen cases with no separation of the fragments. There were nineteen fractures of the process with separation of the fragments from ⅛ to 1 inch. Closed reduction was tried and failed in ten instances. Open reduction and internal fixation were employed in twelve cases. Vitallium screws and stainless steel wire were the preferred internal fixatives. A plaster cast was applied to the arm after operation in nine cases while the application of an elastic bandage was the only means of immobilization in three instances.

Return of function was extremely slow in those cases in which a cast was applied after operation. Separation of the fragments occurred in spite of the employment of stainless steel wire and the application of a cast to the arm with the elbow extended. The earliest and best return of function followed in the three cases in which no external immobilization other than an elastic bandage was used.

It was concluded that fractures of the olecranon without separation produce little or no permanent loss of function of the elbow. The amount of separation is of some prognostic value since it indicates the severity of the injury. Those fractures with a large amount of separation had the greatest subsequent loss of function. Fractures with separation of the fragments of more than ⅛ inch should be treated by open reduction and internal fixation. Careful attention to detail in the insertion of the internal fixative is necessary for success. No external fixative such as a cast or splint is necessary since immediate mobilization insures better function and tends to prevent separation of the fragments.

Discussion

Dr. James Johnson: Dr. Anderson, would you mind repeating how you immobilize the elbow following fractures of olecranon?

Dr. Anderson: I do not believe that any method of immobilization is necessary following fractures of the olecranon. The application of a cast will not prevent contractions of the triceps muscle. The position of the elbow, whether in flexion or extension, furthermore, will not prevent contraction of this muscle. Extension of the elbow is particularly bad from the standpoint of return of function. It is our opinion that it is better to permit free motion of the forearm in order that there is no resistance to the contractions of the triceps muscle, rather than to use some form of immobilization.

*From the Fracture Service of the Minneapolis General Hospital, A. A. Zierold, Chief. Presented by invitation.

PROCEEDINGS MINNESOTA ACADEMY OF MEDICINE

(Continued from Page 687)

That tells you that it takes the proper soil for the carcinoma cell to take hold. That explains also why, for instance, in carcinoma of the thyroid, we get metastases in particular bones. In carcinoma of the prostate we know where we are most likely to find metastases.

If, before operation, instead of trying to kill the carcinoma cells by radiation, we just damage them to a notable degree by giving them a moderate amount of x-ray, then the carcinoma cell is much less apt to find a soil which is ready to let it grow.

I think the whole picture of the many difficulties that are encountered in the large community hospitals is very valuable and I congratulate the doctor on his thesis.

Dr. Alberts (in closing): There was nothing I can recall in looking over those old charts that indicate there were any urinary complications Dr. Hullsiek refers to. Some of the patients had trouble in voiding afterwards but they all straightened around after a short time, and I do not believe there were any records of any permanent bladder complications.

The meeting adjourned.

E. V. Kenefick, M.D.
Secretary

DIET BY TAXATION

Hardly a person now alive remembers the time when federal taxes were levied alone for the simple purpose of raising revenue. It requires no genius to discover that the power of taxation may be put to other uses. Although the Supreme Court of the United States in a memorable decision declared that the power to tax is the power to destroy, few citizens pay much attention to the implications of that statement. In our national life the levying of taxes is being increasingly used as an economic instrument. Taxation is becoming the favorite tool of economic pressure groups who desire to liquidate other pressure groups. The dairy interests, for example, have been conspicuous in their employment of taxation to suppress competing articles of food. Perhaps this example suggested the idea that people could be compelled by taxation to eat what is good for them. In a recent article "Fortification of Foodstuffs"† the proposal is made to compel the use of whole wheat bread by placing a tax on white bread and by offering a government subsidy for the manufacture of whole wheat bread. Perhaps some one will next propose the taxation of beef with a subsidy for the pork packers because pork is richer in vitamin B_1. The government could put a similar levy on grapefruit with a subsidy for orange juice because the latter contains a little more vitamin C. Producers of cane sugar might ask for taxation of corn sugar because cane sugar is sweeter, or sheep raisers might urge a tax on cotton goods because woolens are warmer. If it were not that the power of taxation has been so frequently and so outrageously employed, one could hardly take the latest proposal seriously.—Jour. A.M.A., 117:294 (July 26) 1941.

†Luck, J. Murray: Fortification of Foodstuffs, Nutrition Conference, University of California, Berkeley, Calif., May 3, 1941; Science 94: 31 (July 11) 1941.

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AMERICAN COLLEGE OF SURGEONS

The thirty-first annual Clinical Congress of the American College of Surgeons will be held in Boston, November 3 to 7, 1941. Headquarters will be at the Statler and Copley-Plaza Hotels. The program will include clinics and demonstrations in local hospitals and medical schools, as well as scientific sessions and exhibits in the headquarters hotels.

Dr. Irvin Abell of Louisville is chairman of the Board of Regents and Dr. Evarts A. Graham of Saint Louis is president. Dr. W. Edward Gallie of Toronto is president-elect. Dr. Malcolm T. MacEachern is chairman of the Administrative Board with headquarters at 40 East Erie Street, Chicago.

INTERNATIONAL ASSEMBLY

This year's International Assembly of the Inter-State Postgraduate Medical Association of North America will be held in the public auditorium, Minneapolis, Minnesota, October 13, 14, 15, 16, and 17.

The high standing of the medical profession of Minneapolis, combined with the unusual clinical facilities of its great hospitals and excellent hotel accommodations, make this city an ideal place in which to hold the Assembly.

The Hennepin County Medical Society will be host to the Assembly and has arranged an excellent list of committees who will function throughout the Assembly.

The officers of the Inter-State Postgraduate Medical Association, those of the Hennepin County Medical Society and the Minnesota State Medical Association, extend a very cordial invitation to all members of the profession in good standing to attend the Assembly.

The members of the profession are urged to bring their ladies with them as a very excellent program is being arranged for their benefit by the Ladies' Committee.

A full program of scientific and clinical sessions will take place each day and evening of the Assembly, starting at 8:00 o'clock in the morning.

In coöperation with the Hennepin County Medical Society, the Minnesota State Medical Association and the Minneapolis Civic and Commerce Association, a most excellent opportunity for an intensive week of postgraduate medical instruction is offered by approximately eighty-five distinguished teachers and clinicians from different parts of the United States and Canada who are honoring the Assembly by contributing to the program. The speakers and subjects have been carefully selected by the program committee.

Pre-assembly and postassembly clinics will be conducted, free of charge, in the Minneapolis Hospitals on the Saturdays previous and following the Assembly for visiting members of the profession.

Excellent scientific and commercial exhibits of great interest to the medical profession will be an important part of the Assembly. These exhibits will be open to members of the medical profession in good standing without paying the registration fee.

The registration fee for the scientific and clinical sessions will be $5.00.

Members of the profession who can possibly arrange to attend the Assembly cannot afford to miss it.

With a great deal of pride and satisfaction, we call your attention to the list of distinguished teachers and clinicians who are to take part on the program and whose names appear on page 698 of the advertising section of this journal.

ROSCOE R. GRAHAM, M.D., President, Toronto, Canada

GEORGE W. CRILE, Chairman, Program Committee, Cleveland, Ohio.

WILLIAM B. PECK, M.D., Managing Director, Freeport, Ill.

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Hennepin County Medical Society,
Minneapolis, Minn.

CHARLES E. PROSHEK, M.D., General Chairman, Minneapolis Committees,
Minneapolis, Minn.

MISSISSIPPI VALLEY MEDICAL SOCIETY

The seventh annual meeting of the Mississippi Valley Medical Society will be held in the Hotel Montrose, Cedar Rapids, Iowa, October 1, 2, and 3, 1941. Some forty lectures and demonstrations and thirty-two instructional courses are listed. On October 1 eight Kansas City clinicians will take part. Dr. Joseph B. DeLee, Emeritus Professor of Obstetrics and Gynecology, University of Chicago, will be among the speakers at the banquet on October 2.

Dr. Robert B. Lewy, Chicago, has been announced the winner of the annual Essay Contest and will present his essay on "Comparative Studies in Pain Control" at the meeting.

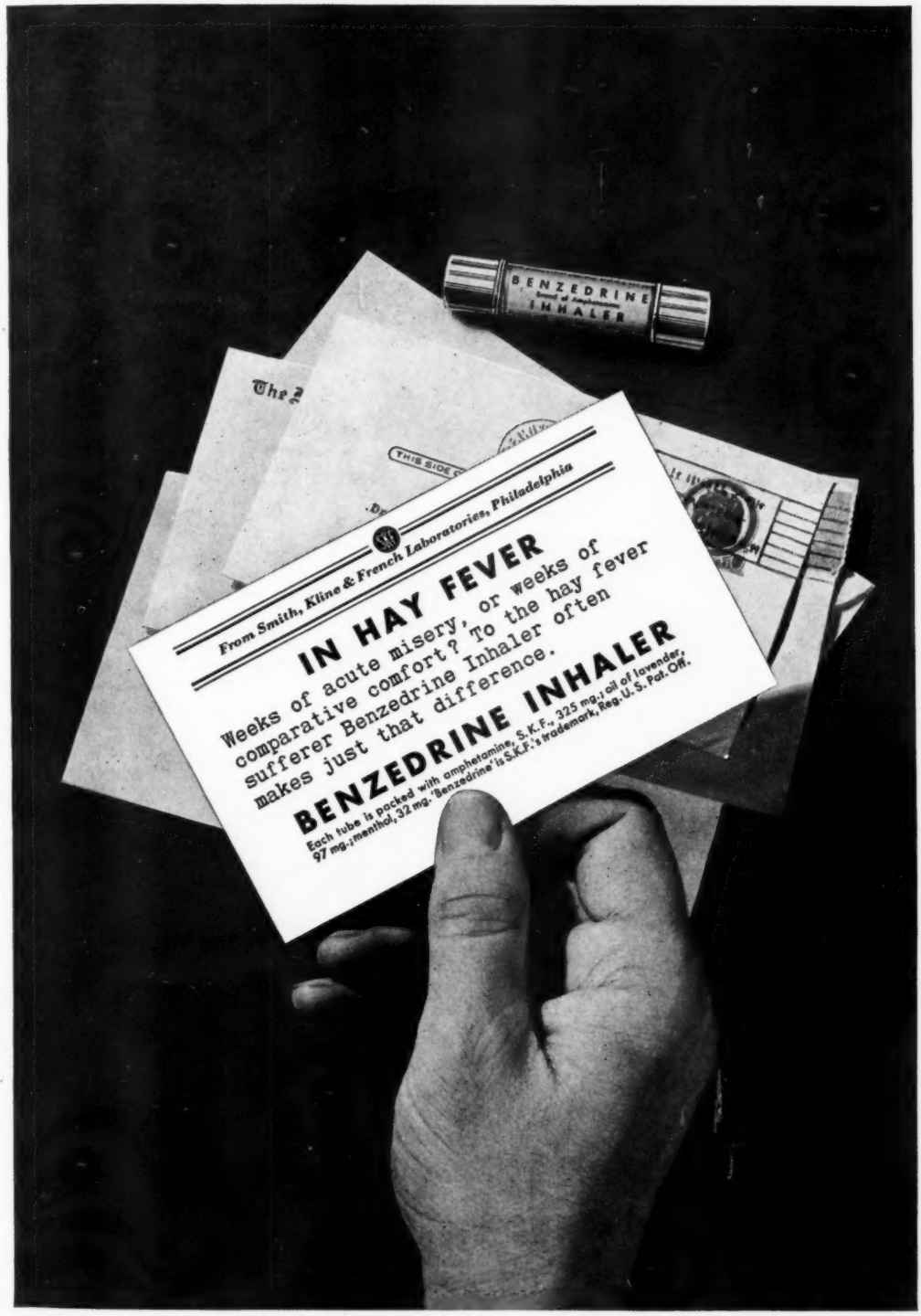
The secretary, Dr. Harold Swanberg, W. C. U. Building, Quincy, Illinois, may be addressed for further information.

MINNESOTA TRUDEAU SOCIETY

Fifty members of the Minnesota Trudeau Society attended a quarterly meeting of the organization in Rochester, June 20, over which Dr. W. S. Lemon presided. A luncheon preceded the meeting, at which papers were given by Rochester physicians. Dr. W. H. Feldman arranged the program.

The August meeting will be held in Eau Claire, Wisconsin.

(Continued on Page 696)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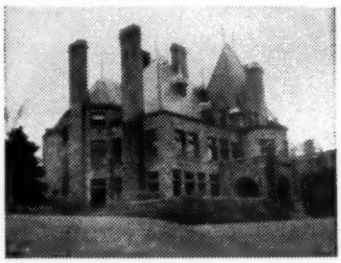

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NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Northern Minnesota Medical Association will be held in St. Cloud, Minnesota, Friday and Saturday, August 15 and 16, with headquarters at the Hotel St. Cloud. The program will be as follows:

Friday, August 15

Morning—8:00 to 11:50 a.m.

Registration

"Hematology of Pernicious Anemia" (Illustrated) CHARLES VANDERSLUIS, M.D., and D. F. MCCANN, M.D., Bemidji

"Our Aging Population"—J. F. NORMAN, M.D., Crookston

"Nephritis"—MOSES BARRON, M.D., Minneapolis

"Roentgenological Studies in Edema of the Lungs" CURTIS B. NESSA, M.D., St. Cloud

"Treatments of Hemorrhoids" (Illustrated)—J. K. ANDERSON, M.D., Minneapolis

Afternoon—2:00 to 4:30 p.m.

"Traumatic Stricture of Common Duct"—JOHN R. PAYNE, M.D., University of Minnesota

"Preparation of a Bed for Home Delivery" (Illustrated)—F. J. SCHATZ, M.D., St. Cloud

"Thyroid Gland Disturbances in Children" — ROGER KENNEDY, M.D., Rochester

"Carcinoma of Larynx" (Operative Technique, illustrated with colored films)—ORVILLE NELSON, M.D., St. Petersburg, Florida

Evening—6:30 p.m.

Banquet at the Country Club

Toastmaster.....W. A. O'BRIEN, M.D., Minneapolis

President's Address, JULIAN DUBOIS, M.D., Sauk Center

Address—"Americanization, A Challenge to Citizenship" SENATOR H. L. WAHLSTRAND, Willmar

Saturday, August 16

Morning—9:00 to 11:50 a.m.

Business meeting

"Recent Advances in Kidney Function"—ARTHUR H. WELLS, M.D., Duluth

"Clinical Pathological Conference"

Conducted by E. L. TUOHY, M.D., Duluth

Participants: GEORGE BERDEZ, M.D., ALBERT KELLEY, M.D., JOHN GRABOW, M.D., GORDON MACRAE, M.D., ELIZABETH BAGLEY, M.D., A. L. ABRAHAMS, M.D., J. R. MCNUTT, M.D., all of Duluth.

The information bureau and the registration desks for both the doctors and ladies will be open at the Hotel St. Cloud, Friday, August 15, at 8 a.m. Registration fee will be $2.50. Tickets for the banquet may be obtained at the same time.

Officers of the Association are: J. F. DuBois, M.D., Sauk Centre, President; G. E. Sherwood, M.D., Kimball, Vice President; C. Jacobson, M.D., Secretary-Treasurer.

OF GENERAL INTEREST

Installed as president of the Mankato Rotary Club recently was Dr. H. B. Troost.

* * *

Dr. Cornelius A. Saffert of New Ulm was married on May 26, 1941, to Miss Helen M. Kienlen, R.N., of St. George, Minnesota.

* * *

Dr. C. C. Clay, head of St. Barnabas Hospital in Minneapolis, has been called into service as an officer in the United States Naval Reserve Corps.

* * *

Dr. H. W. Lee of Brainerd was recently installed as president of the Rotary Club in that city. Dr. Virgil E. Quanstrom is secretary of the organization.

* * *

Dr. Eugene C. Strauss of Fort Dodge, Iowa, has become associated in practice with Dr. W. R. Smith of Grand Marais in the absence of Dr. L. S. Frogner.

* * *

Minnesota men who have been elected Fellows in the International College of Surgeons, and who will attend the meeting of that organization in Mexico City, August 10 to 15, include Dr. J. D. Sturre of Minneapolis and Dr. E. W. Humphrey and Dr. O. J. Hagen of Moorhead.

Dr. William A. Owens has been appointed railway physician at Montevideo by the C. M. St. P. & P. railway.

* * *

Dr. F. W. Behmler of Morris has been re-appointed medical examiner for the civil aeronautics administration at Morris.

* * *

The marriage of Dr. Siegfried C. G. Oeljen of Waseca and Miss Adele Edith Tiede of Albert Lea took place in Albert Lea, June 24. Dr. and Mrs. Oeljen are at home in Waseca.

* * *

Dr. Richard M. Hewitt of Rochester was in Washington, D. C., last month to attend a meeting of the Committee on Information in the Division of Medical Science of the National Research Council.

* * *

A speaker on the program for the annual Graduate Fortnight of the New York Academy of Medicine to be held in New York City, October 13-24, will be Dr. Edgar V. Allen of Rochester.

* * *

Dr. H. A. Shaw of Minneapolis has taken over the practice of Dr. E. N. Nelson in Lake Park. Dr. Nelson recently became affiliated with the Bloomington-Lake Clinic in Minneapolis.

INTERNATIONAL MEDICAL ASSEMBLY

Inter-State Postgraduate Medical Association of North America

Public Auditorium, Minneapolis, Minnesota, October 13, 14, 15, 16, 17, 1941

Pre-Assembly Clinics, October 11; Post-Assembly Clinics, October 18, Minneapolis Hospitals

President, Dr. Roscoe R. Graham
President-Elect, Dr. George R. Minot
Managing-Director, Dr. William B. Peck
Secretary, Dr. Tom B. Throckmorton
Director of Exhibits, Dr. Arthur G. Sullivan

Treasurer and Director of Foundation Fund, Dr. Henry G. Langworthy
Chairman, Program Committee, Dr. George W. Crile
General Chairman, Minneapolis Committees, Dr. Charles E. Proshek

ALL MEDICAL MEN AND WOMEN IN GOOD STANDING CORDIALLY INVITED

Intensive Clinical and Didactic Program by World Authorities

The following is the list of members of the profession who will take part on the program:

Frank E. Adair, New York, N. Y.
Alfred W. Adson, Rochester, Minn.
John Alexander, Ann Arbor, Mich.
Walter C. Alvarez, Rochester, Minn.
W. Wayne Babcock, Philadelphia, Pa.
Lewellys F. Barker, Baltimore, Md.
Claude S. Beck, Cleveland, Ohio.
E. T. Bell, Minneapolis, Minn.
Herrman L. Blumgart, Boston, Mass.
Peter T. Bohan, Kansas City, Mo.
William F. Braasch, Rochester, Minn.
Carl D. Camp, Ann Arbor, Mich.
James G. Carr, Chicago, Ill.
Richard B. Cattell, Boston, Mass.
Russell L. Cecil, New York, N. Y.
Frederick Christopher, Evanston, Ill.
Warren H. Cole, Chicago, Ill.
Frederick A. Coller, Ann Arbor, Mich.
C. Donald Creevy, Minneapolis, Minn.
William R. Cubbins, Chicago, Ill.
Elliott C. Cutler, Boston, Mass.
Walter E. Dandy, Baltimore, Md.
Robert S. Dinsmore, Cleveland, Ohio
Claude F. Dixon, Rochester, Minn.
Daniel C. Elkin, Atlanta, Ga.
John F. Erdmann, New York, N. Y.
A. Carlton Ernstene, Cleveland, Ohio.
Ernest H. Falconer, San Francisco, Calif.
Warfield M. Firor, Baltimore, Md.
John R. Fraser, Montreal, Canada
Henry J. Gerstenberger, Cleveland, Ohio.
Harry S. Gradle, Chicago, Ill.
Evarts A. Graham, St. Louis, Mo.
Roscoe R. Graham, Toronto, Canada.
Howard K. Gray, Rochester, Minn.
Robert G. Green, Minneapolis, Minn.
Russell L. Haden, Cleveland, Ohio.
Emile F. Holman, San Francisco, Calif.
Verne C. Hunt, Los Angeles, Calif.
Thomas E. Jones, Cleveland, Ohio.
Elliott P. Joslin, Boston, Mass.
Louis J. Karnosh, Cleveland, Ohio.
Chester S. Keefer, Boston, Mass.
H. Dabney Kerr, Iowa City, Iowa.
J. Murray Kinsman, Louisville, Ky.
Herman L. Kretschmer, Chicago, Ill.
Frank H. Lahey, Boston, Mass.
N. Logan Leven, St. Paul, Minn.
William E. Lower, Cleveland, Ohio
Charles W. Mayo, Rochester, Minn.
John L. McKelvey, Minneapolis, Minn.
John C. McKinley, Minneapolis, Minn.
Irvine McQuarrie, Minneapolis, Minn.
John J. Moorhead, New York, N. Y.
George P. Muller, Philadelphia, Pa.
Clay Ray Murray, New York, N. Y.
John H. Musser, New Orleans, La.
Horace Newhart, Minneapolis, Minn.
Emil Novak, Baltimore, Md.
Frank R. Ober, Boston, Mass.
Eric Oldberg, Chicago, Ill.
Paul A. O'Leary, Rochester, Minn.
Oliver S. Ormsby, Chicago, Ill.
Ralph Pemberton, Philadelphia, Pa.
Dallas B. Phemister, Chicago, Ill.
Isidor S. Ravdin, Philadelphia, Pa.
Hobart A. Reimann, Philadelphia, Pa.
Erwin R. Schmidt, Madison, Wis.
Elmer L. Sevringhaus, Madison, Wis.
George E. Shambaugh, Chicago, Ill.
Leroy H. Sloan, Chicago, Ill.
Thomas P. Sprunt, Baltimore, Md.
Virgil P. W. Sydenstricker, Augusta, Ga.
Willard O. Thompson, Chicago, Ill.
Maurice B. Visscher, Minneapolis, Minn.
Waltman Walters, Rochester, Minn.
Owen H. Wangensteen, Minneapolis, Minn.
Soma Weiss, Boston, Mass.
Henry M. Winans, Dallas, Texas
Wallace M. Yater, Washington, D. C.
Hugh H. Young, Baltimore, Md.

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HOTEL RESERVATIONS

Hotel Committee: A. N. Bessesen, Jr., Chairman, 2000 Medical Arts Bldg., Minneapolis, Minnesota.

A program will be mailed to every member of the medical profession in good standing in the United States and Canada on or about September first.
Any member of the profession in good standing who does not receive a program, please write the Managing-Director and one will be mailed.

COMPREHENSIVE SCIENTIFIC AND TECHNICAL EXHIBIT. SPECIAL ENTERTAINMENT FOR THE LADIES

Dr. Albert D. Mattson, formerly of Milaca, is now located at Atwater, having taken over the practice of Dr. Lloyd C. Gilman who has been called to duty with the United States Army.

* * *

Dr. Vernon L. Hart of Minneapolis, who maintains offices at 820 Medical Arts Building, has resumed his practice after completing a period of active service with the United States Navy Medical Corps.

* * *

Dr. A. F. Settlage, who has been a member of the Worthington Clinic staff in Worthington since November, 1938, terminated his association with the clinic July 1 to enter private practice at Newburyport, Massachusetts, the home of Mrs. Settlage's parents.

* * *

Four Rochester men are scheduled to present papers at the twenty-seventh annual convention of the Radiological Society of North America in San Francisco in November. They are Drs. John D. Camp, A. U. Desjardins, R. E. Fricke and C. G. Sutherland.

* * *

Dr. L. H. Heinz, a graduate of the University of Minnesota medical school, has become associated in practice with Dr. H. A. Fasbender of Hastings. Dr. Heinz recently completed his internship at St. Joseph's Hospital in Saint Paul.

Dr. John Minckler of Buhl, a graduate of the University of Minnesota School of Medicine, has become associated with the Malmstrom-Sarff Clinic of Virginia. He served his internship at Ancker Hospital in Saint Paul.

* * *

Dr. Woodard Colby and Dr. Alfred J. Ouellette of Saint Paul last month opened a suburban office at 2062 Ford Parkway in the Highland Village district. They will continue to maintain their offices at 809 Lowry Medical Arts Building.

* * *

The Emerson Clinic, located in the new building on East Seventh and Mound Boulevard, Saint Paul, was formally opened Saturday, July 26, 1941. Members of the group are: E. C. Emerson, M.D., R. H. Beach, M.D., G. W. Ittner, Jr., M.D., D. M. DeCourcy, M.D, F. A. Crahen, D.D.S., and B. A. Johnson, B.S., Ph.C.

* * *

Dr. Herbert Boysen, who has been practicing medicine in Welcome for the past fifteen years, is now located in Madelia, occupying offices formerly used by Dr. H. B. Grimes. Dr. Boysen recently completed a two-months' course at the Cook County (Illinois) Post-Graduate School of Medicine.

Dr. P. E. Sheppard recently observed the fiftieth anniversary of his graduation from the University of Minnesota medical school. He was a member of the first regular class to be graduated, although individuals had previously received degrees. Dr. Sheppard has spent forty-eight of the fifty years he has been practicing in Hutchinson.

* * *

Dr. Samuel Nesbitt, a fellow in internal medicine in the Mayo Foundation at Rochester, has been appointed an instructor in medicine at Yale University. He will be engaged in research work and teaching at Yale, and will be a member of the staff of the New Haven hospital, associated with the University.

* * *

Among speakers on the program of the seventh midsummer radiologic conference of the Denver Radiological Club held in Denver, Colorado, July 31-August 1 and 2, was Dr. John D. Camp of Rochester, whose subject was "Roentgenologic Observations Concerning Osteoporosis and Its Relation to Systemic Diseases."

* * *

Dr. and Mrs. W. C. Basom of Saint Paul and Rochester have gone to El Paso, Texas, where Dr. Basom will be associated in practice with Dr. Louis Breck, orthopedic surgeon. Dr. Basom recently completed a three-year fellowship at the Mayo Foundation and received his master's degree in orthopedic surgery from the University of Minnesota.

Dr. John J. Prendergast, clinical instructor in ophthalmology at the University of Minnesota School of Medicine, who has been practicing in Saint Cloud and Saint Paul, has gone to San Diego, California, where he will be in charge of the ophthalmology department of the Rees-Stealy Clinic.

* * *

Dr. C. W. Jacobson has joined the staff of the Bratrud Clinic in Thief River Falls. A native of Kerkhoven, he is a graduate of the University of Minnesota School of Medicine, and has served internships at Swedish Hospital in Minneapolis and at Ancker Hospital in Saint Paul.

* * *

Minnesota physicians who have been relieved from further active duty with the United States Army include:

Dr. Grant Edmund Olson of West Concord, first lieutenant, who has been serving with the 30th Field Artillery at Camp Roberts, California.

Dr. Ernest Sterling Palmerton of Albert Lea, first lieutenant, who has been serving with the 85th Field Artillery at Camp Roberts, California.

* * *

The new addition to St. Mary's hospital in Rochester was completed last month. The addition increases the capacity of the hospital to 868 beds, after allowing for the discontinuance of older sections of the building, and makes St. Mary's the largest private hospital in one unit in the United States. Expansion to 1,000 beds is readily possible.

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1. Knight, F., and Shelanski, H. A., "Treatment of Acute Anterior Urethritis with Silver Picrate," Am. J. Syph., Gon. & Ven. Dis., 23, 201 (March), 1939.

JOHN WYETH & BROTHER, INCORPORATED, PHILADELPHIA

Dr. Walter Gardner of the Anoka State Hospital in Anoka is the president-elect of the Minnesota Hospital Association. Miss Esther Wolfe of the St. Andrew's Hospital in Minneapolis is serving as president this year. Other officers include: Dr. Thomas E. Broadie of Ancker Hospital in Saint Paul and Dr. George H. Freeman of Saint Peter State Hospital in Saint Peter, trustees. Dr. A. F. Branton of the Willmar Clinic in Willmar is executive secretary.

* * *

Dr. J. Lawrence McLeod of Grand Rapids, Minnesota, was elected district governor of Rotary International at the convention held in Denver, Colorado, in June. His district includes Minnesota, North Dakota, Wisconsin and Ontario, and one of his duties will be to assist club officers in his district in administrative matters.

* * *

Medical reserve corps officers ordered to extended active duty within the past few weeks are:

Dr. Thomas J. Edwards of St. Paul, first lieutenant, assigned to Corps Area Service Command Station Hospital at Fort Leonard Wood, Missouri.

Dr. Robert J. Tenner of Rochester, first lieutenant.

Dr. William Oscar Clarke of Minneapolis, first lieutenant, to Corps Area Service Command Station Hospital at Fort Leonard Wood, Missouri.

* * *

Dr. John S. Lundy of Rochester has been named to the Board of Public Health and Welfare to succeed Dr. T. B. Magath who has been ordered to military duty. A commander in the United States Navy Medical Reserve Corps, Dr. Magath has been called for active duty for an indefinite period. He is attached to the surgeon general's office in Washington.

* * *

Physicians whose orders to report for active duty in the United States Army have been revoked include: Drs. Carl J. Fritsche of New Ulm, Harry Bryan Neel of Albert Lea, Harry Allen Palmer of Blackduck, David Howard Rolig of Howard Lake, Clifford T. Wadd of Janesville, Richard A. Whitney of Cambridge, and Dr. Richard H. Barrett of Rochester.

* * *

Dr. John M. Adams of Minneapolis, clinical assistant professor of pediatrics at the University of Minnesota School of Medicine, has been appointed to take charge of the out-patient pediatrics department. He succeeds Dr. Chester A. Stewart, who resigned to head the pediatrics department at the Louisiana State University Medical School in New Orleans.

* * *

A new twelve-month course for physical therapy technicians was inaugurated at the University Hospitals, June 16, with the start of the first summer session. Dr. M. E. Knapp heads the course which is opened to graduates who have degrees in physical education, nursing or medical technology.

Both civilian hospitals and army hospitals need more men skilled in physical therapy. These technicians will be concerned with the physical side of treatment and will work in such mediums as muscle reëducation, diathermy, massage, heat therapy, under a doctor's direction.

* * *

The National Foundation for Infantile Paralysis has granted $10,000 for a 25-bed clinic at the University Hospitals for treatment of poliomyelitis by the system evolved by Sister Elizabeth Kenny, Australian nurse.

In connection with this, the Minneapolis Board of Public Welfare hospital committee has recommended that funds be provided for training two graduate nurses and Kenny technicians at General Hospital and that fullest coöperation be given in the establishment of an out-patient department.

A report on Sister Kenny's work by Dr. Wallace H. Cole and Dr. Miland E. Knapp of the University of Minnesota appears in the June 7 issue of *The Journal of the American Medical Association.*

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When the Upper Peninsula Medical Association met in Ironwood, Michigan, July 17 and 18, papers were presented by several Minnesota men. Physicians on the program and their subjects included: Dr. Herman O. McPheeters of Minneapolis, "Treatment of Varicose Veins"; Dr. Louis A. Buie of Rochester, "Rectal Diseases"; Dr. Leo G. Rigler of Minneapolis, "X-ray in Acute Conditions of the Abdomen"; and Dr. Charles W. Mayo of Rochester.

* * *

Dr. William C. Bernstein, who recently completed his graduate training in proctology at the University and Minneapolis General hospitals, has opened offices at 934 Lowry Medical Arts Building, Saint Paul, where his practice will be limited to diseases of the rectum and colon. Dr. Bernstein will continue his affiliation with the proctology service at the University hospitals.

Dr. Bernstein practiced at New Richland, Minnesota, before beginning his graduate work at the University.

* * *

Dr. John J. Catlin of Buffalo, Minnesota, was selected as "typical of Minnesota's hard-working country doctors" by the *Minneapolis Tribune and Star Journal* for a pictorial feature, entitled "A Day with a Minnesota Country Doctor," which appeared in its June 29 issue. Dr. Catlin, who is sixty-one years old, has been practicing medicine in Buffalo for thirty-eight years. His grandfather and father were physicians, as is his son, Dr. Theodore J. Catlin, who is associated with him in practice.

* * *

Dr. George Bergh of Minneapolis, son of Dr. and Mrs. L. N. Bergh of Montevideo, has opened an office in Montevideo. Dr. Bergh is maintaining his connection with the University of Minnesota Medical School, where he is clinical instructor, and also his Minneapolis office in the Medical Arts Building. He is arranging his schedule so that he will spend Friday, Saturday and Monday of each week at his office in Montevideo, and Tuesday, Wednesday and Thursday at his Minneapolis office.

* * *

The newly remodeled Medical Center Building of Dr. R. G. Hassett in Mankato was opened recently with Dr. Hassett and Dr. Walter B. Kaufman occupying the ground floor. Dr. Hassett has been practicing in Mankato for fourteen years and Dr. Kaufman, formerly of Winthrop, has been practicing there two years.

The building is arranged to provide five office suites on the first and second floors for physicians and dentists. The offices have a joint reception room. An ambulance entrance has been provided.

* * *

A grant of $52,000 from the Rockefeller Foundation for a coöperative program of research in biology and medicine to be conducted by the Mayo Foundation and the University of Minnesota staff members, was accepted last month by the university board of regents.

The grant is to be used in the study of radioactive isotopes as tracers of fundamental biological mechanisms. Under the direction of Dean John T. Tate, uni-

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versity staff members in biology, chemistry, physics and medicine, together with the Mayo Foundation, have conducted this research since 1937 when a grant of $36,000 was made by the Rockefeller Foundation.

Another grant of $17,000 from the Rockefeller Foundation for support of research in the field of biophysics under the direction of Otto H. Schmitt, instructor in physics and biology at the University of Minnesota, was also accepted.

* * *

Two intensive courses in physical therapy technic are being given by the Mayo Clinic in Rochester during the present national emergency to prepare technicians for civilian and governmental work.

The first course began July 1, and the second will get under way January 1. Six months of intensive, didactic training will be given in Rochester and will be followed by six months of practical training in one of the military, medical institutions. To those who do not wish to enter governmental service, six months of practical training will be given in Rochester following completion of the didactic course. Each course will be limited to thirty students for governmental service and ten students for civilian service.

* * *

Newly elected members of the University of Minnesota chapter of Sigma Xi include Dr. A. Louis Dippel, associate professor of obstetrics and gynecology at the University of Minnesota School of Medicine; Dr. John L. McKelvey, professor and head of the department of obstetrics and gynecology; Dr. John A. Layne, instructor in the medical school who left July 1 for Great Falls, Montana, to become associated with the Great Falls Clinic; Dr. John M. Adams, clinical instructor in pediatrics; Dr. Robert E. Priest, medical fellow in otolaryngology; Dr. Richard L. Varco, teaching fellow; Dr. Wallace Sako, medical fellow in pediatrics; Dr. Clarence P. Truog; Dr. Robert L. Meller also of the Medical School.

* * *

The WPA hospital project now being carried on in Minneapolis at General and University of Minnesota Hospitals is being expanded to a state-wide service. The project is for the training and furnishing of non-professional workers, mostly for maintenance work, in publicly owned hospitals throughout the state.

A total of 175 persons have been employed in the two hospitals, while 25 others were employed in a six-month training course at University Hospitals.

With the new appropriation of $841,682, the project will be extended to all forty publicly owned hospitals and sanatoria in the state. In addition to providing added service, it will furnish a reserve source from which hospitals may hire trained non-professional workers to replace those taken by war service or higher pay elsewhere.

* * *

Dr. William J. Cochrane of Lake City has retired from active practice of medicine after forty-five years of service, forty-one of which were in Lake City. With his retirement, the partnership of Dr. Cochrane and

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Dr. H. E. Bowers was dissolved, and Dr. Bowers' son, Dr. Robert N. Bowers of Mazeppa, became associated with his father in practice. The firm is now known as Bowers and Bowers.

Dr. Cochrane, who is seventy-four years old, was instrumental in forming the Lake City Hospital Association in 1916, and with the aid of a committee which he formed, he raised the initial funds necessary. The hospital developed and was replaced in 1939 by the new, modern municipal hospital. Dr. Cochrane is president of the board of directors of the new hospital.

He has served as Lake City's health officer for many years, and for forty years has been a surgeon for the Milwaukee railroad. He was a captain in the Medical Corps in the World War. For thirty-five years, he has been a director of the Lake City Bank, oldest state bank in Minnesota.

* * *

Minnesota men elected to various section offices in the American Medical Association include the following from Rochester: Dr. J. S. Lundy, secretary, section on anesthesiology; Dr. L. A. Buie, delegate, section on gastro-enterology and proctology; Dr. G. J. Thompson, vice chairman, section on urology; Dr. Paul A. O'Leary, member of the American Board of Dermatology and Syphilology.

Dr. F. P. Moersch, representative to scientific exhibit, section on nervous and mental diseases; Dr. F. C. Mann, vice chairman, section on pathology and physiology; Dr. E. V. Allen, secretary, section on pharmacology and therapeutics; Dr. W. L. Benedict, representative at council of Pan-American Congress, section on ophthalmology; Dr. R. D. Mussey, representative to American Committee on Maternal Welfare, section on obstetrics and gynecology.

Dr. Harold S. Diehl of Minneapolis was named to the executive committee of the section on preventive and industrial medicine and public health.

* * *

Promotion of the following staff members of the University of Minnesota, School of Medicine, is announced:

Dr. Welsey W. Spink, medicine, to associate professor; Dr. Charles E. McLennan, obstetrics and gynecology, to assistant professor; Dr. John M. Adams, pediatrics, to clinical assistant professor; Dr. John R. Paine, surgery, to associate professor.

Dr. Abe B. Baker, psychopathic hospital, to associate professor; Dr. William H. Hollinshead, Health Service, to physician; Dr. Lillian Cottrell, Health Service, to mental hygienist and assistant professor; Dr. Archibald H. Beard, medicine, to clinical associate professor; Dr. Royal C. Gray, medicine, to clinical associate professor; Dr. Morse J. Shapiro, medicine, to clinical associate professor; Dr. Samuel A. Weisman, medicine, to clinical associate professor; Dr. Joseph F. Borg, medicine, to clinical assistant professor; Dr. Ragnvald S. Ylvisaker, medicine, to clinical assistant professor; Dr. Lawrence R. Boies, to director of the Division of Otolaryngology; Dr. Kenneth A. Phelps, ophthalmology and otolaryngology, to clinical associate professor; Dr. John J. Hochfilzer, ophthalmology and otolaryngology, to clinical assistant professor, and Dr. Johannes K. Moen, medicine, to professor of medicine.

Also the following in pathology: To associate professor, Dr. Nathaniel H. Lufkin; to assistant professor, Drs. Frank C. Andrus, George K. Higgins, Thomas J. Kenyon and Harold H. Noran.

Promotions in surgery: Dr. C. A. Creevy, to assistant dean and professor of surgery; Dr. James A. Johnson, to clinical professor; Dr. Edward T. Evans, to clinical associate professor; Dr. Ernest Meland, to clinical assistant professor; Dr. Wallace P. Ritchie, to clinical assistant professor.

Promotions in radiology: Dr. Russell W. Morse to clinical assistant professor; Dr. Harold O. Peterson, to clinical assistant professor.

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

ESSENTIALS OF ENDOCRINOLOGY. Arthur Grollman, Ph. D., M.D. Associate Professor of Pharmacology and Experimental Therapeutics in the Medical School of the Johns Hopkins University; formerly Associate Professor of Physiology and Instructor in Chemistry, same institution. 480 pages. Illus. Price, $6.00, cloth. Philadelphia: J. B. Lippincott Co., 1941.

SYNOPSIS OF DISEASE OF THE HEART AND ARTERIES. Second Edition. George R. Herrmann, M.S., M.D., Ph.D., F.A.C.P. Professor of Medicine, University of Texas; Director of the Cardiovascular Service, John Sealy Hospital; Consultant in Vascular Diseases, U. S. Marine Hospital. 468 pages. Illus. Price, $5.00, flexible binding. St. Louis: C. V. Mosby Co., 1941.

THE STRING BEAN HORSE. Camilla Wing. 30 pages. Illus. Price, $1.00, board cover. Excelsior, Minn.: Dannie Books, 1941.

THE SHINY SCOOP. Camilla Wing. 30 pages. Illus. Price, $1.00, board cover. Excelsior, Minn.: Dannie Books, 1941.

ORBITAL TUMORS—Results following the Transcranial Operative Attack. Walter E. Dandy, M.D. 168 pages. Illus. Price, $5.00, cloth. New York: Oskar Piest, 1941.

THE MARCH OF MEDICINE. New York Academy of Medicine, Lectures to the Laity, 1940. 154 pages. Price, $2.00, cloth. New York: Columbia University Press, 1941.

EFFECTIVE LIVING. C. E. Turner, A.M., Sc.D., Dr. P.H. Professor of Biology and Public Health, Massachusetts Institute of Technology; formerly Associate Professor of Hygiene, Tufts Medical and Dental Schools; formerly Director of Health Education Studies, Malden, Mass.; Chairman, Health Section, World Federation of Education Associations; and Elizabeth McHose, B.S., M.A. Director of Physical Education for Girls and Chairman of the Health Council, Senior High School, Reading, Pa. 432 pages. Illus. Price, $1.90, cloth. St. Louis: C. V. Mosby Co., 1941.

X-RAY THERAPY OF CHRONIC ARTHRITIS. (Including x-ray diagnosis of the disease). Preliminary report based on 100 patients treated at Quincy, Ill. Karl Goldhamer, M.D., Association Roentgenologist, St. Mary's Hospital and Quincy X-Ray and Radium Laboratories; formerly Roentgenologist, University of Vienna; honorary member, Mississippi Valley Medical Association, etc. Foreword by Harold Swanberg, B.S., M.D., F.A.C.P. Editor Mississippi Valley Medical Journal and Radiologic Review; roentgenologist, St. Mary's Hospital and Blessing Hospital; Director Quincy X-Ray and Radium Laboratories, etc. 131 pages. Illus. Price, $2.00, cloth. Quincy, Ill.: Radiologic Review Publishing Co., 1941.

CARDIOVASCULAR DISEASES; THEIR DIAGNOSIS AND TREATMENT. David Scherf, M.D., and Winn J. Boyd, M.D., F.A.C.P. 458 pages. St. Louis: C. V. Mosby Company, 1939.

In their book, Cardiovascular Diseases, the authors have attempted to present a concise as well as a comprehensive review of the physiology, pathology, and treatment involved in this particular field. The discussion is not confined to diseases of the heart per se, but includes also a chapter on diseases of the peripheral blood vessels which, because of their increasing frequency, are important to both the general practitioner and the specialist.

The absence of a chapter on electrocardiography does not detract from the excellence of the book; in

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fact, an attempt to outline this aspect of cardiology within a chapter would probably confuse the reader rather than guide him in the use of graphic methods of cardiac diagnosis. It seems wise to have excluded this special field in view of many excellent volumes which have been devoted to it.

The chapter on "Paroxysmal Nocturnal Dyspnea" rather disproves some of the older theories as to its etiology, and gives new ones, which in the authors' experience, are much more acceptable. The authors realize that more work must be done on this subject before an adequate explanation of all the phenomena occurring in this type of dyspnea is found.

Cor Pulmonale is a subject which has aroused new interest in the past few years and the authors give a very good description of it in their volume.

The material is well presented and the student or the practitioner of medicine, who is interested in the diagnosis and treatment of cardiovascular diseases, will find this volume well worth reading.

JOHN R. MEADE, M.D.

INTRODUCTION TO PSYCHOBIOLOGY AND PSYCHIATRY. A textbook for Nurses. Esther Loring Richard, M.D., Sc.D., Associate Professor of Psychiatry, Johns Hopkins University; Physician-in-charge of the Out-patient Department, Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital; Psychiatrist-in-Chief, Baltimore City Hospitals. 357 pages. Price $2.50. St. Louis: The C. V. Mosby Company, 1941.

The text is arranged under two parts: the first is headed "Psychobiology—a study of functioning in normal behavior"; and the second, "Psychiatry or Psychopathology." The term psychobiology was introduced by Adolf Meyer some three decades ago, to refer to "Objective Psychology or Psychobiology with Subordination of the Medically Useless Contrast of Mental and Physical." Dr. Richards covers a wide range of subjects in 357 pages. And she admirably accomplishes a task which we know is a difficult one indeed. The reviewer anticipates that many, many beginning students will come to appreciate the value of this treatise which has the merits of reasonable brevity, clarity of expression, uncomplicated, though adequate, outlining and arrangement of the contents and, above all, the stamps of recognized authority in this field.

J. C. MICHAEL, M.D.

THE 1940 YEAR BOOK OF GENERAL MEDICINE. Edited by George F. Dick, M.D., J. Burns Amberson, Jr., M.D., George R. Minot, M.D., S.D., F.R.C.P. (Edinburgh and London), William B. Castle, M.D., A.M., M.D. (Hon.), Utrecht, William D. Stroud, M.D., and George B. Eusterman, M.D. 934 pages. Illus., Price $3.00, cloth. Chicago: The Year Book Publishers, 1940.

This, the fortieth issue in a long and successful series of annual compendia of abstracts of the current publications in the field of medicine, lives up to the reputation established by its predecessors as a useful volume for the busy practitioner. It contains well-illustrated digests of almost six hundred articles chosen from among more than ten times that number submitted for

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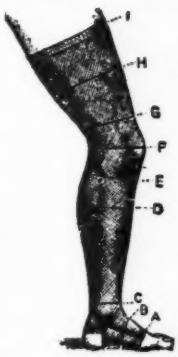

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consideration. A preface recounting the history of the Year Book series, together with a recital of the distinguished names which have been identified with its publication, lends added spice, particularly for those interested in the history of medicine.

The book is divided into five sections each with separate editorial sponsorship: Infectious Diseases, George F. Dick; Diseases of the Chest, J. Burns Amberson; Diseases of the Blood and Blood-Forming Organs; Diseases of the Kidney, George R. Minot and William B. Castle; Diseases of the Heart and Blood Vessels, William D. Stroud; and Diseases of the Digestive System and of Metabolism, George B. Eusterman. At the hands of these men a vast amount of clinically useful material has been reduced to concentrated but still easily assimilable form.

M. McC. FISCHER, M.D.

ENCEPHALITIS IN MINNESOTA

(Continued from Page 666)

to healthy pigeons, mice and cowbirds. Our collections indicate that the species is rather rare in Minnesota. The trap collections in the Twin Cities area in 1938 included only fourteen specimens of *triseriatus* out of a total of 337,960 mosquitoes, but in the hand catch there were six out of the total 4,166. In 1940 the species was represented by five specimens out of 184 caught while feeding in the Army Maneuvers area. This summer I have taken it several times in casual collecting at University Farm.

Ædes atropalpus.—This species, like triseriatus, was added to the list of potential vectors by Davis, 1940. It is a very small species, taken by Owen only in the northeastern part of Minnesota.

The statement has been made that probably "most species of *Ædes* are potential vectors of the virus just as most Anopheles mosquitoes are potential vectors of malaria." Of upwards of two hundred species of Anopheles, a number have been found incapable of maturing the parasite and only about one out of seven of the species is considered of importance as a carrier of malaria. It is too early to make a blanket statement covering the 500 species of the genus *Ædes* because ten species have proved to be capable of transmitting the infection under laboratory conditions.

The mosquito fauna of Minnesota includes twenty-three species of *Ædes*. Of these *Ædes vexans* comes the nearest to meeting the requirements of a good vector of equine encephalomyelitis. It occurs at times in enormous numbers; it viciously attacks both man and animals and individual specimens may live for upwards of three months.

The remaining known potential vectors in our fauna, namely, *triseriatus,* nigromaculis, dorsalis and atropalpus are not sufficiently abundant to play an important rôle in the spread of the infection though they may be responsible for occasional sporadic cases.

Various investigators and most recently Davis, 1940, have attempted to transmit equine encephalomyelitis by the bites of mosquitoes other than Ædes. Davis failed in experiments with *Culex pipiens, Culex salinarius, Anopheles punctipennis* and *Mansonia perturbens.* In the case of the Culex mosquitoes the virus disappeared in two or at most in three days but in *Anopheles punctipennis* it persisted as long as the insects were alive.

In the above discussion no reference has been made to the eastern as contrasted with the western strain in the virus for the evidence indicates that an effective vector can transmit either strain. Moreover, the opinion of Records and Vawter, 1935, that differences between the two types may be only different degrees of virulence, seems supported by the discovery of cases of the so-called eastern strain occurring in Alabama and in Texas. The old idea that there was a sharp line of demarcation in the Appalachian chain of mountains has been disproved.

In an informal report by Dr. Chesley, of the State Department of Health, the statement was made that several of the Minnesota cases reported this year had occurred during the winter. It was not indicated that serological tests were made which demonstrated that these were cases of the equine encephalomyelitis type. If so, it would have a bearing on the problem of insect transmission, comparable to the studies of Kling and Lavaditi on poliomyelitis in Sweden during the winter.

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